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ABSTRACT

This report on the effectiveness of radio instruction and teleconferencing is presented in three chapters: (1) One-Way Audio Instruction--Radio, (2) Two-Way Audio Instruction--Teleconferencing, and (3) Comprehensive Bibliography on Teleconferencing (annotated). Chapters 1 and 2 include sections on determining effectiveness, research, functions, implications, advantages, and selected bibliographies on radio instruction or teleconferencing. Chapter 1 also provides a description of the Subsidiary Communications Authorization. (CHC)

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MORE THAN MEETS THE EYE

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The Effectiveness of Broadcast Audio and Two-Way Audio Instruction for Distant Learning

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Instructional Communications Systems
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Introduction

In deciding whether to allocate resources to any instructional media system, the distinction between what Wilbur Schramm calls "big media" and "little media" is all-important. In ***Big Media-Little Media: Tools and Technology for Instruction***,[1] he defines "big media" as the more complex, costly devices of instruction such as instructional television, films and computer-assisted instruction. These forms are expensive not only in initial capital outlay but in that sophisticated, expensive hardware demands highly skilled and trained personnel to both operate and maintain the hardware and develop and evaluate the software. In contrast, "little media" encompasses less costly, less complex forms of instructional delivery such as radio, telephone, tape recorders, filmstrips, slide transparencies and visuals of all kinds.

The distinction between the two types of media is especially important if the resources to be allocated are scarce. For many years institutions and state agencies in the United States had sufficient resources so that an occasional mistake in a "big media" decision was not considered a disaster. However, the current economic climate has brought a closer scrutiny of investments in educational communication systems. Educational decision-makers are beginning to take a second look at the less expensive forms of delivery - the "little media." These media can simply and inexpensively span great distances and reach sparsely populated areas without great capital outlays or tremendous operating costs.

Decision-makers may then ask, can the "little media" teach as well as the "big media?" This question seems to have been answered: the results of research studies done over the past 35 years indicate that radio, teleconferencing, audio tapes and other little media, when compared with either big media or traditional classroom instruction, perform as well or better on specific educational tasks.

Thus, it is not whether the medium in question can teach, but how we can enhance the effectiveness of its delivery. It becomes, then, a question of how to design or manipulate the medium so that its effectiveness is enhanced under a specific instructional condition (Allen, 1971).[2] Our knowledge of the proper use of instructional media is being broadened by the current research in the instructional technology field. Allen describes studies being done on "the structure and sequencing of instruction, the use of advance organizers, the degree of control exercised over the presentation of content, and other factors...that lead to increased learning."

We have not touched on instructional design research in this paper. This does not diminish its importance in the use of instructional radio and teleconferencing. Some research has been done in both fields; there have been guidelines developed and implemented that attempt to increase the effectiveness in using these technologies. (For example, in order to assist faculty in using the teleconferencing system at the University of Wisconsin-Extension, a research-based training program on teaching techniques has been developed and implemented.)

Future research will give us more answers in the ongoing effort to discover factors involved in the design of mediated instruction which enhance their effectiveness with a specified educational context.[3] We need to keep in mind that we are dealing with the *process* of teaching and learning and in that process, "the technology and the hardware are not the important things; the teacher and the software are."[4]

With the appropriate instructional design, radio and teleconferencing can be effective communication tools, providing information and education to students of all ages.

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[1] Wilbur Schramm. ***Big Media, Little Media: Tools and Technology for Instruction.*** Beverly Hills: Sage Publications. 1977.

[2] William Allen, "Instructional Media Research: Past, Present, and Future," ***AV Communication Review,*** 19, 1, Spring, 1971.

[3] Ibid.

[4] Charles A. Wedemeyer, "The New Educational Technology," ***Journal of the American Dietetic Association,*** 53, 4, October 1968, 325-328.

I. One-Way Audio Instruction - Radio

Introduction

Historical Development of Radio

Since the advent of instructional radio in the 1920's, one-way audio communication has been proven over the years to be an effective mode of instruction.

In the 1920's, several universities experimented with radio instruction primarily as an outgrowth of electronic experimentation. Over 200 radio stations were licensed to educational institutions before 1936. However, more than half of these had their licenses transferred, revoked or expired. In their place, commercial stations rapidly filled the void in the broadcast spectrum.

When FM broadcasting was developed, the Federal Communications Commission reserved part of that spectrum for education, allowing a continuation of educational radio and a renaissance in some areas. In spite of a rocky early development, educational radio today is an accepted mode of effective instruction. In fact, radio is used more widely for instruction today than before the advent of television (Forsythe, 1970).

Radio instruction has been used to teach a variety of subjects including

sciences, foreign languages, music, math, English, literature and social sciences. It has been successfully used as both a supplement to classroom activities and as a direct instructor. Radio's sounds can stand alone as an effective learning message or they can be supplemented with print, visual, or other audio information.

Definition of Terms

Radio instruction has developed a jargon over the years. To clarify the terms relevant to radio instruction, the National Association of Educational Broadcasters' Radio Task Force adopted these definitions as "common usage" terminology:

Instructional radio presents material systematically for the benefit of a student who is working to achieve a specific learning objective.

Public radio presents programming of a general educational, cultural or informational nature directed to listeners who, at the moment of listening, do not consider themselves students.

Direct teaching refers to an instructional presentation that specifies lesson plan, conducts drills and gives tests. This format generally follows local curricula. The teacher, instructor or individual study student simply follows explicit directions to facilitate the presentation.

Supplementary radio programs cover only a portion of the curriculum and are adapted by the teacher, instructor or individual student for select learning applications.

Enrichment through radio instruction brings resources to the classroom that would not otherwise be available. Enrichment programs rarely relate to the scheduled curriculum (Radio's Role in Instruction, 1972).

Radio itself is no longer just main channel broadcasting from a single studio. Today radio delivers taped recordings as well as live studio broadcasts. While it is generally considered a one-way medium, experiments in two-way radio are underway using short-wave radio and the Subsidiary Communications Authorization (SCA) both alone and in combination with telephone hook-ups to radio stations.

Radio Instruction: Determining Its Effectiveness

Primary Research Designs

Three research designs have been used to evaluate radio's effectiveness as an instructional medium. While these designs do not encompass every study, they do represent the majority of studies in this area.

Comparative Studies look at two similar groups of students. One group listens to broadcasts, the other group receives the same information in another manner such as traditional classroom instruction or via television or printed materials. The differences between the two groups are used as a measure of the effects of the media.

Questionnaire Studies measure teachers' and students' opinions concerning the role of radio in achieving instruction objectives and report attitudes toward that instruction.

Experimental Studies aim at identifying unique contributions of radio instruction to the curricular content.

Introduction to Research Concepts

Radio educators are at the beginnings of a systems approach to instructional design for radio.

"The mere presence of a loud-speaker in a classroom is not going to result in miraculous educational changes in boys and girls," said Woelfel & Tyler as far back as 1945.

But it wasn't until recently that literature on educational broadcasting emphasized that the value of radio is directly related to influences such as support material and remotely related to influences of the environment such as political climate.

This "learner within a context" perspective represents the beginnings of a systems approach to software development (Theroux, 1976).

But it is just the beginning. Radio is still fighting several myths that emerge again and again as the basis of research studies on its effectiveness in instruction:

Myth #1: A picture is worth a thousand words.

Myth #2: A teacher teaches best.

Myth #3: It's not what you say or how you say it, it's how you send it.

Although none of these notions can actually be proven or disproven through research, they conceptually place radio into a limited context in evaluations of its effectiveness.

Myth #1: A Picture is Worth a Thousand Words

Studies of radio's effectiveness frequently use its audio capability as a basis of comparison with the visual presence of an instructor or, more recently, with visual images presented by television.

Recent research has refuted the widely accepted notion that a picture is worth a thousand words, especially when the instructional effectiveness of audio and visual media has been compared.

Chu & Schramm, 1967 concluded in their comprehensive survey of learning by television that the use of visual images in instruction was not uniformly beneficial. "The use of visual images will improve learning of manual tasks, as well as other tasks where visual images can facilitate the association process. Otherwise, visual images may cause distraction and interfere with learning."

Forsythe, 1970, in his review of literature on radio's effectiveness, concluded, "Even though radio has been criticized as only an audio medium, studies have shown that visual elements in learning are not uniformly important. In many educational situations, visuals may be more harmful than helpful. Also, the efficiency of combined audio and visual media has been challenged in studies which show that multi-channel communications may not be inherently more effective than single channel presentations."

Travers, 1964, in his study of the relative advantages and disadvantages of auditory and visual transmissions of information, concluded that at any given time during communication, one sensory channel of the receiver seems to predominate and that simultaneous presentation through two channels results in blocking of one.

Carver, 1924, in seven experimental studies of the relative effectiveness of auditory and visual presentations of identical material, found that the effectiveness of auditory presentation tends to be superior for concrete and serial subject matter. "If other conditions are constant, the mental functions of recognition, verbatim recall and suggestibility seem more effectively aroused in listening; whereas critical attitudes and discriminative comprehension are favored by reading..."

McLuhan, 1964, summarized the results of his study of media techniques used to teach four groups of university students preliterate languages. One group received the information by radio, one by TV, one by lecture and one read it. When the same information was given in a straightforward manner with no teaching aids, the results indicated that the students learned most from TV, then radio, lecture and print. The experiment was repeated allowing each medium to function within its full potential of programming by using dramatic and auditory techniques,

attractive layout and supplementary classroom aids. This time, the radio group stood significantly above TV and both ranked above lecture and print.

McLuhan concluded, "TV is a cool participant medium. When hotted up by dramatization,...it performs less well because there is less opportunity for participation. Radio is a hot medium. When given additional intensity, it performs better."

Skornia, 1968, indicated that the addition of pictorial content reduces learning through aural channels. Most interference occurs in three-channel presentations -- audio, print or pictorial. A third and sometimes a second channel does not necessarily advance learning, and often interferes with it.

Radio's Role in Instruction, 1972, concluded that "one audio channel delivers information no faster than the average individual can assimilate it. On the other hand, TV visual information along with its audio channel produces a sort of overload, apparently on the order of two or three times as much."

When evaluating the eye versus the ear controversy, the remarks of Lazarsfeld, 1940, are pertinent. "The truth seems to be that the physiological means of perception is of itself only of small importance in the communication of ideas; what counts is the situation in which communication occurs - the reading and listening habits of the respondent and the character of the subject matter in question."

Perhaps Dr. Lazarsfeld foresaw the "learner with a context" perspective presented in the 1970's.

Myth #2: The Teacher Teaches Best

Direct Teaching

This concept has been the basis for several comparative studies of radio instructed groups to traditional, classroom instructed students. In studies that simply compare radio and the classroom, direct radio instructed groups achieved as well and sometimes better than control groups receiving traditional classroom instruction.

A wide variety of subjects have been successfully taught over the radio including foreign languages, music, art, nature studies, geography, social sciences, English and speech.

Radio in the Classroom, 1942, presents the two-year investigation of University of Wisconsin research staff into radio broadcast use in the classroom. In none of the seven studies conducted comparing selected samples of listening schools and non-listening schools, was there a clear cut difference between the radio and control groups.

In addition to the comparative studies, the research staff conducted questionnaire surveys on the opinions of the teachers

and administrators toward the school broadcasts. A clear majority of the supervisors and teachers found school broadcasts always or generally helpful and the relationship of broadcast listening to the acquisition of information was recognized by the largest percentage of those surveyed.

Searle and Suppes, 1975, evaluated a project in Nicaragua that used radio as the major medium of math instruction for first and second graders. Lessons had a radio and a postbroadcast portion, each about 30 minutes long.

Test results indicated that children in radio classrooms performed better than children in traditional classrooms. The authors also noted that the children remained attentive and responsive for the radio lessons, provided they had an opportunity to respond frequently. In these programs, the children were able to respond at the rate of three or four times a minute on worksheets.

Spain, 1973, reported on a project called "Radioprimaria" which is bringing classes by radio to fourth, fifth and sixth graders in a rural area of Mexico to make up for the lack of teachers in these grades. In spite of disorganization and equipment problems, children taught via radio did as well as children in traditional classes as measured by achievement scores.

Other relevant studies concluded that students instructed by radio in foreign languages, music appreciation, nature studies and other sciences tested equal to or superior to students taught in traditional classrooms (Brewer, 1939; Cook and Nemak, 1939; Harrison, 1932; Heron and Ziebarth, 1946; Lumley, 1933).

Radio instruction also proved to be as effective as instruction received in the presence of the studio narrator (Merrill, 1935; Gaskill, 1933).

Supplementary Teaching

When radio was used supplementary to classroom instruction or as a special enrichment program, radio instructed students achieved as well as students taught in a conventional manner without listening to the programs.

Questionnaire evaluations of teachers' attitudes toward radio instruction found positive assessments of the interest level of radio instructed students and of the effectiveness of radio instruction.

Baer, 1942, reported on an evaluation conducted of "Let's Find out," a program offered on Wisconsin's School of the Air. The program was an educational series written for grades 2-4 to supplement courses in nature studies and social sciences.

The audience was from both urban and rural areas of Wisconsin. In 1941-42, [illegible],553 students were enrolled for the course from 1,667 schools. A majority of the 115 teachers agreed that the program succeeded in acquainting the children with the ways of man and nature, promoted an awareness of community re-

sources, and encouraged continuation of the learning processes outside of school.

Ninety-three percent of the teachers indicated that much or some new information was imparted to the children. Eighty-five percent of the teachers felt that programs were "always interesting" to the children.

A majority of the teachers said that the program was of "great aid" in teaching, and 98% of the teachers were enthusiastic about the value of radio in the classroom.

Taylor, G., 1972, investigated the motivational capability of the radio when used as a reinforcement stimulus in the classroom and looked at whether or not radio could be utilized to improve communication skills.

The radio program assisted regular classroom teachers, in four elementary, three junior and three senior high schools, and a total of 274 students in improving the students' communication skills.

All the students were attending schools in deprived neighborhoods in Washington, D.C. Experimental groups receiving the broadcasts were compared to control groups.

The author concluded that the broadcasts generated an enormous amount of interest among the students. Senior high level students were more intensely involved in the programs than primary level students.

Miles, 1940, investigated the effectiveness of radio programs as a supplement to classroom science teaching by comparing radio taught classes with similar classes receiving traditional instruction. The mean scores of the radio classes showed a significant increase in information and attitudes during the semester. The radio classes which spent the most time utilizing the broadcasts were the only classes that showed a measured increase in interest in the subject matter.

Other studies of supplemental radio instruction have reported positive evaluations of the effectiveness of instruction (Dickson, 1924; Garfinkel, 1969).

Myth #3: It's Not What You Say or How You Say It, It's How You Send It

Studies of the effectiveness of radio instruction have primarily isolated media as a major factor affecting learning. Theroux, 1976, notes that evaluations of radio's effectiveness often focus on a single program design variable such as format or media. Research findings can be affected by different audiences or context dimensions such as differences in communications environment between the comparison groups.

Because the importance of media has been overemphasized in research, Theroux recommends a system approach to program design and program evaluation, taking into account a variety of factors in assessing effectiveness of instruction.

Media Comparisons

Although a variety of factors can affect the amount of learning, in comparisons of differing media, radio instruction consistently compares favorably with silent reading, teachers reading aloud, television and other media in effectively instructing students and effecting attitude changes toward the subject area.

> **Cohen, 1937,** compared the relative effectiveness of silent reading and radio listening in the recall of facts, both immediately following the experience and after a period of three weeks. The radio listening groups did equally well on the tests as the silent reading groups.
>
> **Lanman and Henderson, 1953,** compared the attitudinal change effected by radio listening as compared to silent reading and to teacher reading. They found that changes induced by both the radio program and by silent reading to be significant, while those produced by teacher reading were not. There were no significant differences found between the radio group and the silent reading group.
>
> **Williams, Paul and Ogilvie, 1957,** conducted a study on information gain and retention comparing four different media. The same abstract lecture was presented simultaneously to a TV studio audience, on TV, on radio and in print to four groups of college students matched for grade average. Each group took a thirty-minute multiple-choice examination immediately after the lecture and again eight months later. TV, radio and reading ranked in that order of effectiveness at both examination times.

Questionnaire Studies

Evaluative and subjective studies of radio instruction using questionnaires have yielded positive results.

> **Barr, Ewbank and McCormick, 1942,** reporting the results of a Wisconsin research project on school broadcasting for grades 5 through 8 found from questionnaires, letters and interviews that radio was favored as a means of instruction. Evidence of continued interest in the radio lessons included increased enrollments, purchase of teacher's manuals and requests for extension of radio facilities.
>
> **Henderson, 1968,** conducted an opinion survey of high school mathematics teachers in Wisconsin on the basis of one fifteen minute radio broadcast. All of the teachers who returned

the questionnaire answered "yes" to the question, "Do you feel that future radio broadcasts can be of value to you during your teaching high school students the subject of mathematics?"

Hegemann, 1969, surveyed Wisconsin elementary schools to determine how much of the Wisconsin School of the Air programming was in fact being used. The findings indicated that educational radio is still being heavily used in Wisconsin schools.

Experimental Studies

Specific attributes of radio instruction have been isolated in several experimental studies including the effects of radio in language instruction, short term and long term memory, creativity, values instruction on overcoming prejudice, and current events.

Wisconsin School of the Air, "Let's Draw" course, in the early days of audio instruction, presented stories, dramatic skits, music and sound effects relating to trains or to the zoo. Children in classrooms throughout Wisconsin were urged to draw what their imaginations had generated following the broadcasts. Instructors were amazed by the creativity of the pictures designed by the children.

When television became available for classroom use, the instructors presented a new series of art programs, but the trains and animals drawn by Wisconsin children after viewing them on TV looked the same as the TV presentations. It was concluded that radio is more conducive to allowing creativity in art courses.

Rothney and Hansen, 1947, reported on an experimental study designed to evaluate the effectiveness of radio instruction in teaching children to recognize the basic value of the individual and to overcome prejudice based on race, religion and color. The data indicated that 97% of the pupils liked the broadcasts and 75% of the teachers thought that the program produced better pupil thinking and action.

Carver, 1924, investigated four variable conditions affecting the relative effectiveness of visual and auditory presentation of identical material. From several experimental studies, Carver found that (1) the effectiveness of auditory presentation varies inversely with the difficulty of the material, (2) the effectiveness of auditory presentation is limited to meaningful material and tends to be superior for subject matter that is concrete and serial in nature, (3) if other conditions are kept constant, the mental functions of recognition, verbatim recall and suggestibility are more effectively aroused in listening; whereas critical attitudes and discriminative comprehensions are favored by reading, (4) the higher the cultural level of the listener, the greater is his ability to profit from auditory presentation.

Kottmeyer, 1971, found that radio successfully can be used as an aid to teaching vocabulary. Twenty-four thousand middle grade public school children from St. Louis listened to vocabulary lessons three times a week over the school's radio station. The results of pre- and posttest evaluations indicated that most children achieved well above what was expected on all measures at all levels. Most gains were three to four months above expected increases in vocabulary.

(Other relevant experimental studies include Britt, 1938; Ewbank, 1930; Nias and Kay, 1954; Kornhauser; Kreimer, 1974 and Robinson, 1940.)

Case Studies

Several case studies are available describing various radio projects around the world. Jamison, Suppes and Wells, 1974, provide an overview of radio use in Great Britain, Australia, Japan, Thailand and Mexico.

Bernal, 1968, discusses the use of radio in Sutatenza, Colombia to promote the adoption of innovations. The author concludes that the radio schools are a valuable system of using mass media for the promotion of adoption of innovations. "The higher the effectiveness of the radio schools in promoting adoption of innovations, the higher their effectiveness in the transmission of basic knowledge is supposed to be."

Early, 1972, describes the broadcasting operation of WHRS-FM which serves migrant workers and their children. The goal of the project was to evaluate FM radio as a solution to the serious problem of communicating with the migrant family. Specific aims included reducing children's absenteeism and increasing the participation of the family in school-related activities. Children and adults both showed interest in the radio education programs and average daily attendance of the students showed a definite increase.

(For additional community and post-secondary education case studies see Mcalhone, 1966; Melaragno, 1975; Klugman, 1965; Kinyanjui, 1972; and Dodds, 1973.)

Summary: Research on Instructional Radio

It has been concluded by the authors of several research studies that instructional radio is an effective mode of instruction. This conclusion is based on comparative, questionnaire and experimental evaluations of radio instruction.

It must be noted, however, that many of the studies used imperfect statistical controls and often the amount of radio instruction was only for short periods of time or only supplementary to the teachers' regular curriculum.

Many of the studies are time dated. This could have some bearing on the total communications context. Possible factors that could have affected the total learning environment in older studies include refinements in use of technology, changes in the appeal of radio as a new gadget, or different instructional methods, for example.

There are enough studies that find radio instruction to be an effective mode of instruction, however, to reasonably accept the basic conclusions of Forsythe, 1970, and Chu and Schramm, 1967.

> **Forsyth, 1970,** said, "Experimental studies comparing radio teaching with other means or media have found radio as effective as the so-called 'conventional methods'."

> **Chu and Schramm, 1967,** reported these conclusions relevant to instructional radio:
> (1) Given favorable conditions, pupils can learn from any instructional media that are now available;
> (2) Visual images may cause distraction and interefere with learning;
> (3) Student response is effectively controlled by programmed methods, regardless of the instructional medium.

Therefore, when it comes to evaluating radio instruction, the studies indicate: (1) A picture is not necessarily worth a thousand words. (2) Given a specific instructional goal, if properly chosen and used with appropriate supplementary materials, radio can teach as well as a teacher. (3) Several factors are important in assessing effectiveness of instruction other than just how you send the message.

For these reasons the development of the "learner within a context" perspective holds merit in providing more comprehensive evaluations of radio instruction and in delineating factors in effective instructional designs.

Subsidiary Communications Authorization (SCA)

A discussion of instructional radio would not be complete without covering Subsidiary Communications Authorization. While little research has been done on SCA radio or two-way radio instruction, a select presentation of case studies will follow for both areas.

To say the letters SCA stand for Subsidiary Communications Authorization still doesn't help very much.

SCA is radio, but a special kind of radio. If you could see the FM channel, you would notice that the signal is transmitted along a path much wider than it actually uses. Part of the reason for this is to prevent other FM signals from straying into the wrong path. But there is still some room left over, room that is taken up by the SCA signal. Thus, SCA hitches a ride with FM and travels along the same path, but it can't get off at the same place FM does. That is why you cannot hear SCA on your regular FM radio. SCA needs a special receiver to take it off its path. The receiver is equipped with a special tuner designed to pick out the SCA signal from the main FM signal.

In essence, then, SCA is an electronic technique that places two or more separate signals onto the channel assigned to an FM station. Thus, SCA multiplexing permits an FM station to send out several signals simultaneously.

SCA multiplexing has had difficulty in obtaining status on the communications totem pole. Although the technology for FM multiplexing was developed in 1934, the utilization and development was delayed by legal, economic and political barriers. Commercial development of FM was hampered by the FCC's reallocation of the FM spectrum in 1945. All FM sets and stations had to be re-equipped to function on the new frequencies. Adding to this problem was the fact that low cost AM receivers flooded the market and consequently added greater difficulty to the re-establishment of FM stations.

Major Edwin Howard Armstrong, the developer of frequency modulation (FM) broadcasting, envisioned FM multiplexing as an economic crutch to help the struggling FM stations obtain revenue for operations of the main channel. SCA is an educational medium. But because educational broadcasters had not indicated a real desire or need for supplemental audio program services, they were specifically excluded from SCA regulations such as those provided in 1955 for commercial FM stations to provide background music to offices, factories and stores. During 1960, however, it was satisfactorily proven to the FCC that educational broadcasters had a growing

need for the auxiliary services provided by multiplex SCA signals. In February, 1961, the FCC authorized SCA operation by educational FM stations in a manner compatible with their non-commercial status.

The Wisconsin Experience with SCA Radio

Wisconsin SCA was developed to meet a need for continuing education to medical doctors throughout Wisconsin. From the original post-graduate medical program that started in 1965, SCA was expanded not only in the number of listening locations but in the diversification of its programs to many other areas. Programs ranged from the original medical conference to the fields of pharmacy, English, law, social work, economics, library science, education and nursing.

A statewide SCA system was made possible by utilizing the state FM network. The system consisted of eight FM transmitters located throughout the state that provided statewide coverage of WHA radio programming. Thus, the SCA signal piggybacked on the state FM network signal and was carried to most parts of Wisconsin.

Ninety SCA receivers were located in courthouses, University of Wisconsin campuses and centers, hospitals and high schools. Listening centers were established so that projected materials, group discussion, and individual discussion sessions could become an intricate part of SCA's educational programs.

To ask a question from a SCA listening location, the student listener would place a telephone call to the SCA studio. The conversation was transmitted over the SCA radio system so that everybody listening to the lecture at any of the locations would hear the discussion. In this way, SCA radio in combination with telephone use is a two-way, interactive medium.

Types of Programs on SCA

Although most of the programs on this system were non-credit, at least one graduate course was offered per semester. In a less structured format, the system was also used for faculty meetings and informal exchange from all parts of the state.

Graduate Credit Courses Via SCA

For many years, University of Wisconsin-Extension offered graduate credit courses to teachers in various Wisconsin communities. By using SCA, on-campus professors were able to expand the classroom boundaries to the

boundaries of the state and many persons in isolated areas were offered graduate credit courses in their own communities.

Because most students enrolled in SCA courses had not been previously exposed to unconventional educational techniques, a training process was incorporated into the course. To help orientate these students, the professor lectured from various SCA listening centers, allowing each class around the state to participate in some live lectures. Lectures were transmitted by means of a special audio system, using regular telephone lines at the listening locations. The lectures were conducted via SCA to students at participating campuses. The professor can have two-way communications with all students at the SCA campuses regardless of the origin of the lecture because of the interactive teleconference links.

Slides, videotapes and 16mm films were used in conjunction with the lecture at each location. They were mailed to the students from the Madison campus in advance.

Short Segments/Part of Design

Most credit courses were three hours. Through evaluation of these courses, it has been determined that this time period must be divided into short learning segments. For example, the lecture should not last any longer than 12-15 minutes at one time. Student activities such as buzz groups and class presentations via the system should be interwoven into the instructional design. Active student involvement with short learning segments has proven to be successful. Evaluation and instructional design techniques have been developed and can be interwoven into the distant learning program.

Informational Exchange in Faculty Meetings

The SCA network has been used in many different ways. Each Monday morning at 9:00 a.m. a statewide faculty meeting was held. Daily at 8:30 a.m., messages for faculty in counties were sent via the SCA system. Then the traffic was reversed and messages from faculty were received by University Extension in Madison.

Emergency Situations

The routine morning times were also used to give information about emergency situations such as insect or disease outbreaks in crops. During a recent corn blight, an extension plant pathologist used the Monday morning conference to transmit information to agricultural agents on the status of the disease in the state and to suggest recommendations for its control.

There are many other utilizations of SCA radio. That is not to say that the use in Wisconsin is the best or the only way. It fulfills an educational

need. Other potential uses of SCA have been demonstrated by the Albany medical programs; the credit courses of WVWC radio station in West Virginia, Wesleyan, in Buchanan, West Virginia; and of course the visually-handicapped programs that have virtually inundated SCA utilization in the United States.

Uses of SCA

Albany Medical College

One of the early stations to use SCA was the educational station WAMA-FM in Albany, New York. The major thrust of this station is to provide continuing medical education to seven allied health professions in the New England area. The lecture portion of the program is broadcast on the main channel and the SCA channel is used for talk-back of network lectures and discussion groups. In this case, the program material is carried on the main channel to groups in classrooms and questions and comments are returned to originating stations by means of the SCA channel. There are about 50 SCA receivers located in hospitals with the minimum usage-per-day about three hours.

Efforts are being made to get other groups interested; for instance, Albany had a series for high school counselors and last year held four conferences geared to senior citizens who met in public centers.

SCA Transmits Programs to Blind

Minnesota educational radio has basically served as the model for programs for the visually handicapped via SCA throughout the United States. Minnesota offers approximately 17 programs hours per day, seven days a week, for the blind or visually handicapped using approximately 5,000 SCA home receivers.

Programs begin with reading some daily newspapers and continue with readings from periodicals which include current novels in magazines so that the blind or visually handicapped listener can be as current as the sighted reader.

West Virginia Westleyan Credit Program

Throughout the nation, a few colleges and universities are probing the use of open learning, non-traditional study and the extended campus. While some are probing and studying, WBWC-FM in Buckhannon, West Virginia with Westleyan College is doing an innovative program of providing

educational opportunities to students in their home communities by using SCA radio. The program, a result of a Title III Higher Education Act, HEW grant, provided SCA broadcasters and receivers to the University to provide and develop educational programs for students throughout the listening area.

Slow Scan Television Via SCA

Slow scan television or any digital transmission can be transmitted on the very narrow frequency range of the SCA carrier. It is therefore possible to transmit visual information originating from a central slow scan studio via SCA in conjunction with the audio material. Slow scan television transmits still pictures rather than motion pictures as with normal television systems. Two school systems have been engaged in the exploration and utilization of slow scan television and SCA: WFBE-FM community college in Flint, Michigan and WETL-FM South Bend community school corporation in South Bend, Indiana.

Leasing Commercial SCA Channels for Education

There are, undoubtedly, educators reading this report who do not have available an educational FM station providing SCA potential. Today, the major users of commercial SCA either engage in background music businesses themselves or lease the facilities to music operators. Because of the tremendous income potential that commercial SCA offers FM stations, transmissions via SCA have been rapidly accelerating in the past few years. Major transmissions in the United States by FM utilize SCA transmission capabilities for background music.

At this point educators should consider leasing the SCA from a commercial FM station. An educational SCA network could be designed by leasing commercial SCA channels for transmission of educational programs over a wider area.

Experiments in SCA

There is relatively little experimental research on SCA instruction. As previously mentioned, SCA has been extensively used by the University of Wisconsin-Extension in conjunction with WHA-Radio and Wisconsin's Educational Telephone Network (ETN).

A description of the services provided by Wisconsin's SCA and ETN is available in Parker, 1974.

One of the great untapped potentials of SCA is in providing enrichment programming to high schools. Currently, SCA-ETN is being used to bring in scientists from the universities to high school students in Wisconsin.

Experiments in SCA use have been done on providing reading services for the blind and on home instruction for handicapped and disabled students (Skalnik, 1977; Lolis, 1968; Nyberg, 1975; Vince, 1975).

> **Skalnik, 1977,** noted that while SCA systems are relatively costly to operate, they provide more comprehensive service, up to 18 hours a day to the blind. Radio reading over SCA provides the print handicapped with a wealth of information that sighted persons take for granted.
>
> **Lolis, 1968,** studied the intellectual, academic and social-emotional development of physically handicapped and homebound students receiving instruction for 15 months of radio broadcasts with telephone hook-ups to subject specialist broadcast teachers. Students were also regularly visited by home instruction teachers.
>
> Experimental results indicated no significant differences in intellectual or academic development between the experimental and control students. Teachers' ratings and clinician judgments of figure drawings indicated that the experimental students showed a significantly more positive orientation toward social interest, even though there was little behavior change.

SCA is a virtually untapped natural resource. With the proper utilization, SCA has the potential of meeting many educational needs.

Other Two-Way Radio Applications

Other studies of two-way radio instruction, in addition to SCA radio, have focused on the use of short-wave radio. Short-wave has been used with success to teach foreign languages and science instruction.

> **Garfinkle, 1976,** described the language by radio interest group's successful use of short-wave radio broadcasts on radio Peking to listeners in North America wanting to learn Kuaya (Standard Chinese). An English textbook was supplied to accompany the broadcasts.
>
> **Uslan, 1976,** reported the successful use of short-wave radio to teach geographic and related physical science concepts to fifth grade students. The experimental group achieved significantly higher post-test scores than the control group.

(Other uses of two-way radio are reported in Dermody, 1975 and Cassierer, 1970.)

Functions of Radio Instruction

A. For Extended Access

1. To distantly located classrooms.
2. To isolated individual students in sparsely populated areas.
3. To high school and elementary pupils.
4. To working people.
5. To isolated professionals.
6. To homebound students.
7. To hospitalized students.
8. To adult learners in sparsely populated areas.
9. To special interest groups.

B. As A Time Saver

1. Eliminates travel time.
2. Reduces the time that special resource persons need absent themselves from work to help distant learners.
3. Reduces the time that professionals need absent themselves from work to meet continuing education requirements.

C. As A Money Saver

1. Reduces traveling expenses.
2. Costs are usually shared by several institutions that can use the programs and facilities jointly to produce programming.
3. Radio programs are inexpensive to produce and programming reception is accessible to listeners.
4. Radio has proven to be cost-effective compared to other media.

Implications of Radio Instruction

A. As Compared to Other Media

1. Radio is a simple and familiar piece of equipment.
2. Radio is a medium of the outside, adult world and can bring in new and unconventional ideas to the classroom.
3. Radio is a part of a large network of stations and can use national programs of general and educational appeal.

4. Because radio is audio communication, it allows the students to use their imagination to supply missing detail.
5. News reports are readily available to supplement current events education.
6. Radio can create a vivid sense of actual happening.
7. Radio continues in time allowing cumulative programming effects over long or short periods of time.

B. Other Implications

1. Radio programming integrates the schools into the community and vice versa through local programming.
2. Radio provides an excellent tool for in-service training and updating information for many professional fields.
3. Radio brings in outside resources that might not otherwise be available to students or the community.

Summary: Advantages of Radio Instruction

Advantages of One-Way Radio Instruction

A. Comparison studies indicate that radio instructed students learn as much as students from other modes of instruction.
B. Radio instruction motivates students to learn by bringing in special, outside resources.
C. Radio meets the educational needs of students in remote locations.
D. Radio instruction allows personalized communications between students and teachers.
E. Radio, coupled with a telephone link to the radio station or broadcast site, or through the use of short-wave radio, allows interaction between students or between students and their instructor.
F. Radio creates an efficacy of its own, transmitting a sense of immediacy and involvement in the programming.

Advantages for Instructors

A. A comprehensive radio instruction program makes sharing among educational institutions feasible and economical. Sharing instructors allows schools to offer more complete education and allows outstanding teachers to reach out to students attending different location schools.

B. With minimal training, radio programming can be used in conjunction with or instead of classroom instruction.
C. Radio can be supplemented with other media.
D. Radio programming can be adapted to a wide variety of educational needs.

Advantages of Radio

The unique educational advantages of radio are many. Research on radio instruction, though limited by scientific and situational factors, is consistent in finding radio to be an effective mode of instruction.

Additional studies are needed on the elements of radio programming that lead to effective instructional design. Now that the "learner within context" perspective has been introduced, more information is needed about the learning contexts that result in effective audio instruction, not just on the modes of instruction.

The response to radio and audio programs in the United States has been varied but generally favorable. The real significance of radio as an educational medium is not in the statistical analysis but rather in its special capabilities:

* It provides for truly continuing education, enabling participants to receive limited amounts of information frequently.
* This allows students to assimilate the new information into their daily activities.
* There is great economy in time and money for participants and for faculty who are not required to travel significant distances or spend significant amounts of time away from occupational or teaching responsibilities.
* Programming and educational departments are able to reach entirely new audiences, which had been neglected previously.
* Instructional radio enables us to reach isolated professionals who would otherwise be in an educational vacuum. Professionals have indicated they would not have settled in certain communities if continuing education had not been available via radio instruction.
* The public relations aspect of radio use is significant. The programs presented via radio systems offer tangible evidence that participating institutions are vitally concerned with the practical, day-to-day problems of students and professionals.

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II. Two-Way Audio Instruction - Teleconferencing

The Historical Development of Teleconferencing

Early Beginnings

There are many variations and levels of sophistication implicit in the generic term "teleconferencing." Its origins are as difficult to pinpoint as a single definition.

The first reported use of telephone in a conference mode was in 1939 when Dr. Winterstein, director of special education in Iowa, initiated a project to meet the needs of home-bound and hospitalized students. With the aid of AT&T, Dr. Winterstein had intercom equipment installed in students' homes, and class lectures were transmitted to them. Within two years, more than 1,000 students in the state were benefitting from this use of the telephone (Rao and Hicks, 1972).

During the sixties, the use of "amplified telephone" to reach homebound students was common.

In 1947, teleconferencing began on the university level at the College of Dentistry of the University of Illinois. This program, an extension service for dentists in Scranton, Pennsylvania and Chicago, was hailed as a "novel extension service in education" at that time.

Educators experimented with many pilot programs in teleconferencing during the fifties. The most exhaustive and long-standing of these was the Stephens College telephone network instituted in 1958. Conceived and organized by Dr. Alfred Novak and James A. Burkhart, it was first applied for in-service training of science faculty at a group of colleges. In 1958, it was expanded for use in undergraduate courses. This allowed for faculty and facility sharing among several small colleges and universities in the area. It also made it possible for isolated students in Columbia, Missouri to hear reknowned speakers such as Senator Robert Taft and Harold Stassen via telephone (Yeomans and Linsey, 1969).

By 1960, the idea had spread, and the University of Omaha instituted a telelecture program with audiences of up to 500 people. This program flourished, and a few years later the University of Omaha and the University of Colorado organized a "Share-the-Professor" telelecture program to exchange undergraduate credit classes three times a week.

The Blossoming - 1960-1970

In 1965, Wisconsin's Educational Telephone Network (ETN) began with a Postgraduate Medical Program. In its first three years, enrollment went from 190 to 180,000 a year, and programs expanded from 1 to 982 (Parker, 1968). Wisconsin's ETN program has since grown to be one of the nation's largest. In 1978, for example, programs in continuing education (both credit and non-credit) reached over 33,000 students.

In 1966, the University of West Virginia began a telelecture program to give in-service training to isolated Appalachian education administrators. It allowed them to institute programmed learning offerings in small rural schools, an impossible task in terms of time and money without a telephone network. After two successful years of operation, West Virginia added a telewriter to their facility, which proved to be a major innovation in teleconference technology and networking (Puzzoli, 1970).

In the late sixties, networks sprang up at the University of Illinois (Douglass, 1969), in the Missouri secondary school system (Leonard and Gies, 1970), at the University of Nevada in cooperation with the Western States Small School Project (Tucker, 1968), and at the University of Wyoming, as well as numerous one-shot projects and experiments in teleconferencing.

The Seventies: Diversity and Growth

In recent years, these networks have stabilized and grown in both scope and use. Networks that were established to reach students at remote campuses are used today for administrative conferences, daily reports from field advisors and special guest lectures and conferences as well.

New networks make their appearances every year. In 1970, 18 small colleges in Kansas affiliated in a network called KCRCHE Communications Network (Pfeiffer, 1971); Telenet (Wakefield and Vaden, 1973) was also established in Kansas. Three Oregon colleges around Portland formed the Associated Christian Colleges of Oregon.

In 1971, the University of Minnesota, Minneapolis used teleconferencing for the first time and in 1972 Canada's Department of Indian and Northern Affairs began a teleconference system.

Innovative high school teleconference programs were introduced in the early seventies. In Dover, New Jersey, a telephone network brought special guests into the school (Schwartz and McNeely, 1971) and in Maryland, high school students conferred with University of Maryland admission officials via a telephone network.

This short history represents only the major developments in teleconferencing systems. But it is enough to show that the general trend for teleconference systems is toward greater refinement and expanded potential.

Though by no means exhaustive, this history does point up some general characteristics of teleconferencing's development:

1) There is a high incidence of telephone conference systems in the Midwest (Iowa, Missouri, Wisconsin, Illinois, Kansas).
2) The non-Midwestern systems, such as in Utah and Canada, are in sparsely populated and largely rural areas.

These observations suggest that teleconference systems have stepped in where there is a fundamental need for outreach services and expanded educational communication.

Many new, large telecommunications systems have been initiated only where there is a good supply of technological expertise and money, or a large enough population to justify operation. In contrast, teleconference systems have grown up where the need for improved communications is the greatest, irrespective of financial power. This is how teleconference systems have earned their "grass roots" label.

Teleconferencing: Determining Its Effectiveness

During the years that teleconferencing has been used for education, what has been learned about its effectiveness? What characterizes the use of teleconferencing in instruction? These are some of the questions experimenters in education have been attempting to answer since teleconferencing's beginnings.

Before looking at the research on these questions, some of the modes of this communications system should be defined. The primary modes of teleconferencing are from simplest through most advanced: I. Telelecture; II. Teleteaching; III. Teletutoring; IV. Telephone-based instruction; and V. Telewriting.

I. *Telelecture* is a pre-arranged phone call from a classroom to a resource person who enriches regular classroom instruction by bringing in expertise not otherwise available. Telelecture also provides students with the opportunity to ask questions and make comments which are then amplified through special telephone equipment for the entire classroom. To make it easier for students and resource people to interact, several microphones may be placed throughout the room.

II. *Teleteaching* enables a home-bound sick or handicapped student to keep up with the class without actually being there. Through the use of a two-way telephone placed in the classroom, the student can hear everything that is going on, and can indicate by a signal when he or she wants to speak or answer a question. Everyone in the classroom is able to hear what he or she says, as if the student were present in the classroom.

III. *Teletutoring* gives students a means of getting in touch with a tutor for individual help. Used mainly in correspondence education or other types of independent study, teletutoring can originate with a call from the student to the tutor or vice-versa. Teletutoring can also be used for tutorial groups, with members at several locations.

IV. *Telephone-based instruction* transmits and amplifies communication between an instructor and group(s) of students or single individuals at distant locations. This system can be thought of as a huge "party-line" where all groups and individuals can hear and speak with each other, allowing questions, discussion and participation by everyone. Telephone-based instructional systems can be "dedicated" (a permanently installed network using leased lines) or "dial-up" (a network established at the time the class is held.)

V. *Telewriting* involves using a visual component to supplement audio teleconferencing. Although telewriting will be discussed as a separate entity, its visual component can be used with all phases of teleconferencing. Telewriting uses a device, either mechanical-electronic or fully electronic, which enables instructors to send hand-drawn graphics through the telephone lines. The graphics are then reproduced at the remote locations via overhead projection systems or television monitors, depending on the system used. (Other visual devices, such as slow scan television, which can be used with teleconferencing systems, will not be discussed here because of the limitations of this paper. However, they are or will soon be available for use with teleconferencing.)

I. Telelecture

Much of the early literature describes the telelecture--a prearranged phone call from a single classroom to a resource person for class enrichment. This early use of the telephone for education showed the value of enhancing curricula by bringing in valuable resource persons by teleconferencing. Although the studies of telelecture are mainly descriptive rather than statistical, they provide insightful material on the characteristics of teleconferencing as a medium.

These case studies illustrate the use of telelecture in enriching library science courses:

> **Hartje, 1974.** Amplified telephone was used for a graduate class in Library Science at the University of Missouri-Columbia. The telelecture given by an academic library administrator was judged to be a successful educational experience and the author recommended teleconferencing as a method for Library Science education.

> **Helliger, 1972.** A graduate seminar on information retrieval used telelecture. The course, taught at Kent State University of Ohio, used outstanding individuals from across the country to present hour-long "telelectures." Response was very positive.

An experiment using telelectures to enrich courses at Stephens College, Missouri, showed positive results when telelectures were integrated into college courses. Experimental groups showed positive gains in both cognitive knowledge and motivation.

> **Burkhart, 1960.** A one-year experiment in four different college courses used regularly scheduled interviews with prominent individuals. Modern business, philosophy, American government and world literature classes were used for the experiment. Pre- and post-tests consisted of an inventory of beliefs and a knowledge test. Experimental sections were taught by regular methods, with the addition of the telephone interviews. The

> experimental groups which completed the test procedure scored significantly higher than the control groups. In the course in American government, students did more voluntary outside reading if they participated in the telelectures than if they were part of the control group. At the end of the school year, approximately ten percent more students in the experimental sections planned to major in political science.

Telectures have been described as highly motivating experiences (Schwartz and McNeely, 1971) and as valuable supplements to classroom instruction (Mandelbaum, 1966). As Hartje points out: "written and verbal comments of the students show(ed) the reoccurrence of theories and philosophies expressed during the telelecture." This use of the telephone for instruction has been and will probably continue to be a convenient, low cost way to enrich courses.

II. Teleteaching

Teleteaching (using teleconferencing equipment to enable a sick or handicapped student to keep up with the class without being present) is the telephone's oldest use in education. It has been found to be a viable instructional alternative to students who cannot be present in the classroom for long periods of time because of illness or disabilities. Case studies in the field emphasize success.

Duhrels (1965), a high school teacher, tells how she taught a girl so crippled by cerebral palsy that she could not be in the classroom. The girl was successfully taught typewriting.

Braucher (1976); Hofmeister (1976); Lewis (1976); Steele (1969); Lolis (1968) and Rao and Hicks (1972) present case studies in which teleteaching was used successfully. Project TELPAC, for example, organized to provide instructional information to parents of handicapped children, was deemed the most appropriate telecommunications system for rural areas (Hofmeister, 1976).

State telephone companies have become involved in teleteaching by facilitating and organizing "teleclasses" and "home-to-school" services. Illinois' "home-to-school" service is a program where selected classrooms are fitted with special portable telephone sets and the instruction piped to homes of distant students. Modified "talk-listen" switches permit disabled youngsters to operate the equipment and interact with class members (Lewis, 1976). California's "Teleclass" facilitates a telephone teacher's class to handicapped or homebound children for home instruction at a regular time each day (Steele, 1969).

Thompson (1977) measures the success of teleteaching partly in terms of student attitudes. She describes teachers involved in the program as observing:

A student who enters the program as passive and withdrawn develops into a lively, outgoing person, interested in doing things and in other people.

A highly self-centered student becomes concerned for other people.

A child who, at the beginning, depends heavily on his parents, calls for a glass of water, whispers or shouts, "But I don't understand how to do it," begins to say, "I can get it. No, Mom, I'm on the line."

In summarizing the use of teleteaching for home-bound and handicapped students, it appears that it is serving a need well. Unfortunately, although there is much anecdotal material regarding teleteaching's successes, little statistical evidence is available in the literature. Flinck (1976) summarizes teleteaching by saying, "Very few evaluative studies have been carried out. . . (although) many articles and reports described (teleteaching) and the writers regard the method as very successful."

III. Teletutoring

Teletutoring can serve a variety of educational functions. In a supportive function, combined with correspondence education or other types of independent study, teletutoring gives students a means of getting in touch with a teacher or tutor for individual help. The method differs from other telephone methods in the two ways described by Flinck (1978):

First the student is supplied with the basic information by other means than the telephone, e.g., by textbooks, a correspondence course, broadcasting, television. The information by telephone is thus a supplement. Secondly, the support given is individually adapted to the needs of the student.

Teletutoring has been used with a number of multi-media educational delivery systems to allow students to get in touch with their tutors.

Bedall, 1971. At Telekolleg in the Federal Republic of Germany, students were able to phone questions directly to the television teacher at selected times. Questions were answered directly on the television screen.

Schmidbauer & Zigerell, 1971. In Chicago TV College, students were allowed to discuss subject-related problems so they would not feel completely isolated. A group teacher was available for telephone calls almost every day; the television teacher was also available for telephone calls on a limited basis (two hours).

Turok, 1974. The British Open University uses teletutoring on a group basis; groups are connected by telephone to discuss course work. The course work may be delivered by a variety of methods: correspondence, textbooks, television or radio programs.

These case studies illustrate the two-fold use of teletutoring: to allow students to get immediate feedback in answering questions and solving problems related to course work, and to overcome the independent learners' feelings of isolation.

A number of studies have investigated the benefits of integrating teletutoring into the course structure.

Gorosch, 2967. An experiment aimed at teaching English to vocational teachers being trained to serve as experts in developing countries was set up as a home study course, with telephone calls to a tutor every two weeks an integral part. The telephone calls gave practice in English conversation and the reading of English texts, as well as the opportunity for questions and discussion. The evaluation indicated that the students were satisfied with the system of telephone calls.

Ahlm, 1972. This study investigated the influence of teletutoring on student achievement in mathematics. Students in the experimental groups were invited to call their tutor at special hours if they had any problems. The students who called tutors made greater progress in their coursework than those who did not call.

In terms of student attitudes towards teletutoring, several studies by Flinck (1976, 1978) indicate that students react positively to teletutoring and believe the telephone contact was of great help to them in their correspondence study.

Teletutoring is just beginning to be recognized as a valuable resource to be used in combination with other educational delivery systems such as correspondence education, television and radio. Many more studies need to be done to determine the results of combining teletutoring with other media. However, Flinck (1968) concludes, "We can establish that telephone tutoring has been experienced positively by those students who received it. It has mainly been used to treat subject-related problems but it has at the same time given the students an opportunity to discuss personal or social problems, a possibility which might have contributed to the students feeling less isolated in their study work."

IV. Telephone-Based Instruction

Telephone-based instruction (using the medium to reach groups of students and/or individuals at locations distant to the instructor) has been carried on extensively in many areas of the country for over a decade. Case

studies dealing with this method describe a wide range of subjects, students and technical systems. However, for purposes of this study we have focused mainly on those studies which either (1) demonstrate the use of teleconferencing in public schools, (2) delineate the use of an ongoing educational network such as Wisconsin's ETN, or (3) include an experimental or quasi-experimental basis as the data source. There are many other reports and descriptive case studies which will not be discussed; they provide a wealth of background information on teleconferencing and are listed in the bibliography.

It should also be noted that many of these experiments were conducted before the invention of adequate technical teleconferencing equipment. Individual researchers may not mention the technology's inadequacies simply because their equipment was the state-of-the-art at that time. In retrospect, however, this must be considered. Even with inadequate equipment, the experiments indicate that students were able to receive the message transmitted and all students were able to hear and interact with each other. The advent of new telephone lines, cable systems or satellites, will greatly enhance the technical quality and accessibility of student/teacher and student/student interaction.

Use of Telephone-Based Instruction in Public Schools

Telephone-based instruction was reported to be an effective instructional method in the following case studies demonstrating the telephone's use in public schools. Subjects taught by telephone included chemistry, history, sociology, Latin and art.

Rookey, et al. 1971. Report of a three-year experiment in the Finger Lakes Region of New York State to teach high school subjects. The first year, chemistry was taught to students at a remote location via teleconferencing. The students were bussed to a central school once a week for laboratory periods. The experiment proved so successful in terms of student achievement and acceptance that it was expanded the following year to include 12 high schools. Course offerings were increased as well, to include history, sociology and Latin. The author concludes that "the use of the telephone medium is valid and should be used more extensively. The medium does require some special handling, but nothing that a typical school district cannot provide with its existing personnel."

Jesser and Clarke, 1966. Amplified telephones and coordinated overhead visuals were used to bring art instruction to 11 small high schools financially unable to support art programs of their own. In Nevada, Oregon, Idaho and Utah, art students were supervised by local interested teachers, and their work was mailed to a master teacher who made get-acquainted visits to each classroom at the beginning of the semester. The authors

concluded that the two-year experiment showed teleconferencing is highly effective in communicating basic art skills to students.

Beattie and Frick, 1963. To bring outstanding teachers to the high school classroom, five small Colorado schools examined multi-school sharing of information through teleconferencing. Three of the experiments involved college professors lecturing via telephone to high school students in American history classes. The instructors felt that their students benefitted from the experiment.

Merrell, 1968. Three Utah elementary schools wanted to determine if students entering small, rural schools have disadvantages and if so, the schools wanted to develop materials and procedures to meet such deficiencies. Pre-testing revealed significant differences in vocabulary development and experiential background between the rural students and the urban control population. One elementary school made extensive use of the amplified telephone and established companion schools in New Mexico and New York City to offset the disadvantages of isolation. Students tested after two and three years of programs designed to improve instruction (of which amplified telephone was only one) showed significant gains in vocabulary and reading skills.

As an educational delivery system, telephone-based instruction has also been used to teach public school teachers mathematics, language, reading diagnosis, issues in education, and teaching methods. The following reports describe this function:

Nunley, 1977. The effects of teleconferencing in retraining two groups of elementary school mathematics teachers was studied. Pre- and post-tests of achievement, mathematical ability and attitude were given to both the teleconferencing group and the group in a conventional, face-to-face situation. There was a significantly greater positive mean change in content mastery for the teleconferencing group than for the conventionally taught group.

Finger Lakes Regional Supplementary Education Center, 1968. Sixty-nine teachers in 14 school districts were taught reading diagnosis by telephone. Sixty-one of the subjects were tested against 15 others who received instruction in the conventional manner. Students taught by telephone did as well as those taught conventionally.

Tucker et al., 1968. A pilot program explored how teachers in small schools might receive quality in-service education. The course "Critical Issues in Education," a one-credit course, was studied. The author concludes that a telephone-taught course is a satisfactory instructional technique for reaching teachers in remote areas.

King, 1971. Three methods of teaching an in-service teacher education course were compared for their influence on learning, teaching performance, attitude towards the course, method of presentation and cost. Fifty-five vocational teachers were divided into three groups and taught by one of the following methods: telephone-based instruction each week, face-to-face instruction each week, or alternate weeks of each method. Analysis of pre- and post-tests showed no significant differences among the three groups in achievement, performance or attitude. The telephone-based instruction was found to be more economical in instructor costs and travel time.

Brown, 1968. In a project undertaken by Education, Inc., under the auspices of the Appalachia Educational Laboratory, in-service instruction was provided to 15 teachers scattered throughout five states. The in-service course leader had previously met each of the people and knew a considerable amount about each one. She corresponded with them weekly and the author states, "There probably was more communication between these teachers and their instructor than in a typical college course." Brown reports the results: "Normally it might have taken from five to ten years to muster the experience and training staff necessary to install this advanced curriculum in these schools. . . the job (was accomplished) in less then six weeks and the training the teachers received was far more intensive than that which usually accompanies new curriculum programs."

Use of Telephone-Based Instruction in Post-Secondary Applications

Telephone-based instruction has also been used to teach undergraduates, graduates and continuing education students in such areas as money management, consumer issues, state and local government organization, junior college issues, descriptive linguistics, adult basic and G.E.D. education, occupational experience supervision, dietetics, and dairy breeding. The following are a number of the studies reporting the success of these experiments.

Blackwood and Trent, 1968. Seventy-one students enrolled in a short course on money management were evaluated. All were members of County Extension Homemakers units in Kansas. Pre- and post-tests were given to both groups--the 34 who were taught in the traditional face-to-face method and the 37 who were instructed by telephone. Results showed no significant differences in the amount of learning which took place.

Hoyt and Frye, 1972. The effectiveness of six classes taught remotely by amplified telephone was compared with that of identical on-campus classes at Kansas State University. Courses

were in the following subject matter areas: consumer issues, state and local government organization and dynamics, junior college issues, descriptive linguistics, adult basic and G.E.D. education, occupational experience supervision. Judged on the basis of academic achievement, telephone classes and on-campus classes were equally successful. Using progress on students' goals as a criterion, five pairs of telephone and on-campus classes achieved similar results, while for the other pair, the telephone classes had a significant advantage.

Spears, 1977. Members of the American Dietetics Association of Missouri attended either a teleconferencing session or a workshop session on professional education topics. The experimental group consisted of 64 dietitians and the control of 77 dietitians. The subject matter, instructional materials and instructor were the same for both techniques. Evaluation of pre- and post-tests found no significant differences between the two groups in terms of achievment. Spears concluded that the teleconferencing method was as effective as the workshop method in updating the professional background of the participants.

Conlin and Borich, 1977. Using the network at the University of Minnesota, the same dairy breeding presentation was given to 142 farmers in 13 county meetings as was given to 85 farmers in five county meetings who received their information from the county specialist. Pre-tests and post-tests showed no significant differences between students who learned by teleconferencing and those who learned by in-person instruction.

Use of Telephone-Based Instruction in an Ongoing Educational Network

One of the world's largest telephone-based instructional systems is at the University of Wisconsin-Extension (ETN). This system began because of a need for continuing education for medical doctors, nurses and social workers (Parker, 1974). The participants are brought together via teleconferencing equipment available at 200 sites throughout Wisconsin. In 1978, over 33,000 students were reached by this delivery system. A wide range of courses, both credit and non-credit, are offered over the network, which is also used for administrative functions. Case studies describing some of the types of programming in Wisconsin provide insight into the flexibility of telephone-based instruction. (For example, one of the most innovative uses of teleconferencing occurred when music and cello technique courses were taught over the network.)

Meyer, Hansen et. al., 1968. This early study of ETN for continuing medical education describes the positive attitudes of physicians and paramedical personnel in community hospitals throughout Wisconsin towards telephone-based instruction. Preliminary evaluations of pre- and post-course examinations

gave the authors confidence in the effectiveness of the system. They report that, "Technically, a high quality of transmission can be achieved." The authors continue, "In addition to savings in time and geographic flexibility, the advantages of the system include the wide variety of program formats and content which it permits. For example, a clinicopathological conference (C.P.C.) was held as one of the medical conferences. This was conducted in the usual fashion with each group of participants being asked to contribute its diagnosis during the course of the conference." Group participation was high.

Ristau, 1973. A graduate extension course enrolling 164 Wisconsin school teachers, administrators and counselors was taught using ETN in conjunction with interface sessions bringing together several local ETN groups for presentation and discussion. In rating the course, nearly half the students evaluated it as equal to, or better than, traditionally taught extension courses.

Pellett, 1970. The author compared the effectiveness of ETN lectures to the face-to-face situation of conventional in-service training meetings for county extension agents. He concluded that ETN can be an effective medium for communicating cognitive knowledge.

Cooper and Lutze, 1970. A telephone re-training project was started to ameliorate the shortage of active nurses in Wisconsin. An informal evaluation indicated that the nurses were satisfied with the program. The main aim was to return inactive nurses to professional jobs, but no pressure was put on them. The results indicated that of the 550 enrolled, 12 percent returned to active practice; several earlier than they had intended.

Regan and Haasch, 1969. In this training program for nurses, students found the experience "personally satisfying" and the information useful to them in their work.

Apfel, 1976. A Smoking Modification Clinic was held over ETN by the Department of Continuing Medical Education in 1974. Evaluation results indicated that ETN programming can cause behavior changes in participants.

Arndt and Weinswig, 1974. Based on nondidactic elements such as enrollment, attendance patterns and professional specialties, the authors analyzed the quality of teleconferencing as a continuing education tool and concluded that it provides convenient, economical, efficient and effective continuing pharmacy education.

These selected case studies are representative of the literature on telephone-based instruction. We have found no other evaluative studies of the telephone-based instructional method, but many other articles and reports mention the method as very successful. Generally, the literature search

shows that there are no differences between telephone-based instruction and face-to-face instruction. It should be noted, however, that final generalizations cannot be made from the above experiments for the following reasons:

1 Samples are so small that there is a considerable risk that errors of the second type (announcing no differences when there were actually two differences) might be committed.

2 The initial similarities of the telelecture groups and control groups were not always established by pre-test.

3 When pre-tests were administered, they were not used to reduce the unexplained variance in the post-test results, thereby not refining conclusions about the relative effectiveness of the competitive systems.

4 Evaluations were seldom comprehensive; objectives other than academic achievement were rarely studied. None of the studies examined student gains on affective or psychomotor objectives. More importantly, only one considered measuring success from the students' frame of references (see Hoyt and Frye, 1972).

We must also repeat a previous observation: many of these experiments and case studies were conducted prior to the advent of adequate technical teleconferencing equipment. Obviously, the equipment used would have played some role in the experiment results.

V. Telewriting

Before concluding this discussion of the effectiveness of teleconferencing, a brief look at telewriting is in order. Telewriting is a visual element which can be used with teleconferencing. An electrowriter draws handwritten graphics which are electronically transmitted to screens in remote classrooms. A number of studies have explored the uses of telewriting, including its uses in the University of Wisconsin-Extension SEEN system. Subject areas have included Hebrew, psychology, business, engineering, mining, modern mathematics and agriculture.

Edelman, 1967. Adult classes in reading and writing Hebrew were taught using teleconferencing. A control group was compared with each of two experimental groups. Score analysis on a midterm and an oral reading test indicated no significant differences between the performances of the three groups.

Puzzuoli, 1970. At West Virginia University, Morgantown, courses in mining, engineering and modern mathematics were given to on-campus classes as well as to extension classes. The achievements of the two groups showed that extension students' mean scores were equal to or significantly greater than those of on-campus students.

Wecke, 1970. Engineering and agriculture classes were extensively studied by the University Extension Network at the University of Illinois. Final grades earned by 338 teleconference students were compared with those earned by 488 on-campus students. No significant differences were found between the two groups. Course evaluation questionnaires also indicated that in all aspects of the course, remote students rated their courses as high or slightly higher than the university course norm.

Boswell et. al., 1968. Three classes in introductory psychology were taught at the University of Missouri, St. Louis. The 64 member control group received an on-campus lecture while a second group of 63, also on campus, received a live lecture, which was simultaneously transmitted to a third group of 22 in a remote classroom. Results indicated no significant differences in the amount of learning between the three groups.

Wentorf and Adams, 1973. This report investigated the success of a management course offered to M.B.A. students using the Wisconsin SEEN system. Students ranged in age from 20 to over 40, in education from a high school diploma to beyond an M.B.A., and in business experience from none to over 15 years. Results from test scores indicated that SEEN is applicable to a wide variety of students regardless of their backgrounds and goals. The authors concluded from student attitude inventories that the "mechanics" did not detract from the course's regular presentation and that the course's success depends more on other factors. The course was structured around behavioral objectives. Students reacted favorably to these objectives, saying they helped them study for the course. The objectives were also an effective means of organizing instruction, learning experiences and evaluation.

Jackson, 1976. This survey gathered information about students who had participated in courses offered by the Extension Engineering Department using SEEN. Two hundred and eighty-two responses were tabulated. The acceptance of this delivery system was obvious: one in five students had participated in more than one SEEN course, and seven out of eight would participate in a SEEN course again.

In characterizing telephone-based instruction supplemented by telewriting, Wentorf and Adams (1975) conclude that (1) the SEEN system appears to be appropriate for presenting business courses, judging from student academic performance and attitude, (2) the technique is a relatively

neutral factor while course design factors are more integral to success, and (3) offerings should be expanded.

Summary: Teleconferencing

It is impossible to make any formal conclusions from the array of uncoordinated studies in teleconferencing. The studies have approached teleconferencing with diverse measurement methodologies and techniques, and produced results that are incompatible and varying in reliability. Some of the studies were done in comparison with other media; others were not. Some are based on interviews with the participants; others incorporate extensive statistical evaluations. An overall analysis of teleconferencing, on the basis of these evaluations alone, is impossible and invalid.

However, in extensive research of various teleconferencing systems, Casey-Stahmer and Havron (1973) have developed valuable guidelines for evaluating any teleconferencing system. They contend that a distinction should be made between user satisfaction and the overall effectiveness of the system. This distinction is useful for our purpose. Most of the reports and studies presented here have loosely indicated that users are satisfied with the teleconference method of learning. Generally, the reports point to a high level of user satisfaction.

Effectiveness measures what these teleconferencing systems have successfully accomplished. We can draw no firm conclusions about effectiveness from these scattered studies, but they can form the basis of a list of teleconferencing's functions. The following lists suggest these functions that teleconferencing can perform effectively and the implications of these functions.

Functions of Teleconferencing

A. For Extended Access:

1. To isolated professionals.
2. To working people.
3. To high school and elementary students.
4. To home-bound students.
5. To hospitalized students.
6. To students and adult learners in sparsely populated areas.
7. To specialized interest groups.

B. As A Time Saver

1. Eliminates travel time.
2. Reduces the time that professionals need to be absent from work to receive continuing education.
3. Reduces the time administrators must spend writing and making individual phone calls to colleagues.

C. As A Money Saver

1. Reduces travel expenses.
2. Spreads costs among all the institutions and departments using the teleconferencing system.
3. Adapts to many uses. Once installed, a teleconferencing system reduces the total cost of educational programs.

Implications of Teleconferencing

A. Compared to Other Media

1. Provides a cost effective way to get educational information to widely dispersed groups or individuals.
2. Costs little to maintain and operate.
3. Adapts to many educational and instructional needs.
4. Provides immediate feedback and two-way communications.

B. Other Implications

1. Integrates schools into the community and the community into the schools.
2. Provides an excellent tool for delivering in-service training and educational updating to professionals in many fields.

Conclusions

The most important question to be answered is whether this communications system fills a need for the institution and the students. Clearly, education via teleconferencing is not a cure-all. Teleconferencing will never replace face-to-face classroom instructors as the mainstay of education. However, education via teleconferencing is the answer to many of the problems facing educational institutions today. Because teleconferencing is inexpensive, it is suited to the current economic realities. Its adaptability, its flexibility in being expanded or reduced, and its versatility in being used simultaneously for education and administration makes teleconferencing attractive to both elementary and secondary schools. One of the greatest advantages of teleconferencing as an instructional system is its incredible versatility. It can be adapted to many listening stations and many audiences. Also, the commitment to teleconferencing in no way determines the scope of the programming, because the initial financial outlay is only for the broadcasting facility and station equipment.

With proper planning and implementing, teleconferencing can be an effective, distant learning communications system.

Summary: Advantages of Teleconferencing

I. Advantages of a Two-Way Interactive Teleconferencing Instructional System

A. Motivates students to learn.
B. Proves ego-satisfying for students.
C. Provides ways to meet the needs of students in remote locations.
D. Helps students learn as much as other modes of instruction.
E. Allows personal communication between teachers and students.
F. Allows student-to-student communication; an interaction essential to educational instruction.

G. Allows for sound levels and projected images to be controlled to correspond with learners' needs.

II. Advantages for Instructors

A. Makes faculty sharing possible among educational institutions. Faculty sharing allows institutions to offer more complete educational programs, and allows outstanding teachers to reach out to students in many locations.

B. Does not impose any additional work load on instructors after their initial training.

C. Can be used as a break-in medium to help student instructors overcome nervousness during their first teaching experiences.

III. Advantages for Institutions

A. Offers flexibility in planning and scheduling through its use of taped programs as well as live lectures. Both audio and projected visual materials may be recorded and played back as needed.

B. Provides universal access points, which allow for coping with unexpected emergencies.

C. Allows class offerings for a limited number of students in different remote locations simultaneously.

D. Provides quality instruction for students in remote rural areas.

E. Eliminates many travel costs for schools and saves time for instructors. Instructors do not have to travel for hours to give lectures, and classes do not have to be cancelled because of a lack tutors.

F. Allows institutions to share costs, thus enabling them to offer high quality educational programs to all students throughout the the state. And the system may be used for administrative purposes when it is not being used for instruction.

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III. Comprehensive Bibliography on Teleconferencing

Administration

Anderson, L. R. *ETN—SCA—SEEN Dean's Advisory Committee Report*. University of Wisconsin-Extension, Madison, 1973.

The Educational Telephone Network (ETN)--Subsidiary Communications Authorization (SCA)--Statewide Extension Education Network (SEEN) Advisory Committee of the University of Wisconsin was appointed to explore and reexamine previous guidelines established for ETN—SCA—SEEN operations. The general areas predefined were 1) program design, 2) publicity and promotion, 3) technical systems, 4) learning centers, and 5) operational procedures. The report is divided into the five subcommittee areas. Specific recommendations are included in the summary.

Anderson, Leonard. "Educational Telephone Network." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

When ETN, Wisconsin's Educational Telephone Network began, county extension offices met with many problems. The author was appointed chairman of a committee to suggest procedures for the ETN system. The article lists the results of this committee and the guidelines which a later committee issued concerning program design, promotion, publicity, a technical system, learning centers and operational procedures. Additional procedures used by Monroe County Extension office for its five ETN outlets are included.

Daniel, John and Bertrand, Guy. "Telefun at the Universite du Quebec: (1) Teleconferencing." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

Teleconferencing has become an activity of increasing importance at the Universite du Quebec in the last four years. This paper describes, from both technical and organizational points of view, the development of the system and summarizes the results of studies on its use. The system has attained a high degree of user acceptance which provides a realistic basis for the future developments which are discussed.

Daniel, John S. "The Use of Teleconferences in the Administration of a Geographically Dispersed Organization." Unpublished manuscript, Teleuniversite, Universite du Quebec, 1975.

Teleconferences have been used in a routine manner in the administration of the Universite du Quebec for nearly three years. The author summarizes the experience acquired over this period for the benefit of other organizations which may be considering the adoption of a teleconferencing system.

Dick, Robert. "Staff Meeting by Telephone." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The author gives an example of a staff meeting involving 350 people of the University of Wisconsin-Extension. The general benefits and limitations of such a meeting are cited. The shortcomings of such a staff meeting via telephone can be eliminated or minimized by adequate planning, and the author elaborates on this point. The importance of ground rules, rewarding good staff meeting performance, response mechanisms and confidentiality of responses are also discussed by the author.

Gold, Ben. "A Plan for Development of an Educational Telephone Network (ETN) to Extend Access to Educational Programs." Los Angeles Community College District, Division of Educational Planning and Development, October 1973.

The model of the Outreach Development Process presented here is designed to increase access to education to district members not presently enrolled in one of the district colleges. The plan involves: identifying educational needs, determining if these needs can be met by the community colleges, determining which college should be responsible, scheduling and planning courses, developing educational strategies, selecting faculty, producing media, selecting a delivery response system, implementing a marketing plan, enrolling students, and evaluating results. The Educational Telephone Network (ETN) is a delivery-response system for extending access to educational programs. Procedures for district coordination of ETN development and an evaluation of an ETN course offered in the Los Angeles Community College District are provided.

Hanson, Wayne. "Telelecture in Minnesota." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The growth of the telelecture at the Agricultural Extension Service-University of Minnesota is given. Program development by Extension Specialists is explained; the responsibilities of staff personnel, the scheduling office, the Bell Telephone Co., the Dept. of Information and Education Aids are listed, and the evaluation results for the program (1970-72) are all given.

Legault, Frederic. "Telefun at the Universite du Quebec: (3) La Telegestion au Nordquest." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

This paper describes the development of administrative and educational teleconferencing in North Western Quebec and summarizes the results of a study held in Rouyn-Noranda.

Parker, Lorne A. "ETN—SCA Program Handbook." University of Wisconsin-Extension, Madison, 1969.

The purpose of the handbook is to establish a common understanding of the use of ETN-SCA by presenting some guidelines which may be useful to programmers using the system. Sections in the handbook include an explanation of the ETN-SCA systems, registration procedures, program preparation and presentation, the studio moderator, the local program convener, publicity, ETN-SCA evaluation and an appendix.

Seaman, Millie. "Operational Aspects for Program Planning." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

This article discusses the procedures and guidelines that are used today by University of Wisconsin-Extension, Madison, Programmers in implementing their programs. These procedures apply specifically to general types of programs, that is, noncredit and credit programs involving registration. There are modifications to accommodate different types of programs. With a large variety of programs, procedures do not follow a rigid pattern; they are tailored to particular needs. Specific steps taken in setting up a program for ETN (Educational Telephone Network) are discussed.

Sparkes, J. J. "The Open University's Educational System." *The Status of the Telephone in Education*, University of Wisconsin-Extensio· Madison, May 1976.

The autho briefly describes the overall teaching strategy of the Open University in order to show what part the telephone plays today, and could play in the future.

Turok, Ben. "Telephone Conferencing for Teaching and Administration." Paper presented at a Seminar on Telephone Conferencing, Steering Group on the Development of Telecommunications in the Open University, University College, London, 18 July, 1975.

This paper examines the needs of adult education and suggests that telephone conferencing can provide much valued support. It shows that the technological and system problems involved are similar to those encountered by any large organization using telecommunications extensively. Various remedies are proposed to overcome these problems and to lay the basis for the extension of this mode of communication.

Vogt, Richard. "Economic Intercity Service for Educational Networks." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The author discusses the Telpak service, the operations of the Federal General Services Administration, and some significant drawbacks to extensive reliance on federal telpak. The conclusion states that "the ability of networks like ETN to provide economical telecommunications service depends directly on the efficiencies obtained by the state by combining all intercity requirements into an integrated and comprehensive whole."

Weinstock, Ruth. "British Open University: Media Used in Context." *Planning for Higher Education*, 4 (2:3/5), April 1975.

This profile of the British Open University is offered by Educational Facilities as one of a series to document the experience with the uses of technology in higher education. The emphasis is on its exemplary use of educational technology in context. A look at the details of how the Open University employs media to serve a large dispersed student body may benefit others who plan to expand or modify their own uses of educational technology.

Weinstock, Ruth. "Educational Technology Revisited: Outreach by Telephone." *Planning for Higher Education*, 4 (3:2/5), June 1975.

Examples in the pharmacy and medical fields illustrate the success of ETN as a means to relay newly completed research to practitioners. The article also deals with ETN's instructional techniques, and the technology involved in operating the system. Extension's relationship to the campuses is discussed as are the strategies that move teachers to accept the ure of media. Finally, the author speaks of the cost of running ETN and the revenue involved.

Case Studies

Apfel, Lyn. "Changing Behavior via ETN Programming." *The Status of the Telephone in Education*, University of Wisconsin-Extinsion, Madison, May 1976.

The author states that use of the Educational Telephone Network (ETN) by the Department of Continuing Medical Education and the various evaluations based on pre- and post-testing indicated that the medium did not interfere with the educational process. In 1974 the department presented Smoking Modification Clinic over ETN which reconfirmed that conclusion. However, most importantly, for the first time it documented for the department a reported change in behavior as a result of participation in ETN programming. The author describes that Smoking Modification Clinic.

Arndt, Jack R. and Weinswig, Melvin H. "An Analysis of Five Years' Experience with the Telelecture Method in Wisconsin." *American Journal of Pharmaceutical Education*, May 1974, pp. 208-13.

This analysis is concerned with determining the quality of telelectures as a con-

tinuing education activity based on non-didactic elements such as enrollment, attendance patterns and professional specialties of the enrollees. The paper includes an explanation of the telelecture method, a brief history of Wisconsin's ETN, and the design of Pharmacy ETN courses. The authors conclude that telelectures are convenient, economical, efficient and effective.

Bailey, Ann. "Retraining Emergency Medical Technicians Via Telephone Conferences." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The author describes the Department of Continuing Medical Education of the University of Wisconsin-Extension's use of ETN and concludes that ETN provides access to, and efficient use of, a highly qualified physician faculty and a low-cost method of reaching large numbers of Emergency Medical Technicians.

Baker, Doris. "Wisconsin Social Workers Participate in a National Symposium--by Telephone." *National Association of Social Workers Conference in San Francisco*, University of Wisconsin-Extension, Madison, 1968.

The three-page paper includes an explanation of the format of the National Symposium of the National Association of Social Workers, the preparations made in 1967 and 1968 to hold the program, and a post-session appraisal. The latter section conveyed briefly the reasons for the positive response by the participants and an explanation for several disappointments experienced.

Blockstein, William L. and Durant, Winston J. "Continuing Education and the Tele-Conference Technique." *American Journal of Pharmaceutical Education*, 32, November 1968.

The authors explain the teleconference technique employed by extension services in pharmacy, University of Wisconsin, as one of the means of providing for continuing education. The paper gives a brief description of how Educational Telephone Network (ETN) works, and tells of the early development of ETN programs in pharmacy.

Brown, Sandra M. "Telelecture: Appalachia's In-Service Classroom of the Air." *The Instructor*, 78, October 1968.

The purpose of this project was to provide in-service instruction for fifteen teachers in five states simultaneously. It was to demonstrate that a single course could be conducted via telephone in widely separated locations. Teachers in the project were Head Start instructors who were helping to introduce into their school systems new language arts material. Reaction to the telelecture project was enthusiastic.

Christiana, Ciel. "Long Distance Lectures." *New York State Education*, 51 (2), November 1963.

Dr. Moses Hadas, head of Columbia University's Department of Greek and Latin, delivered via telephone 18 lectures on "Ideas in Antiquity," a graduate course in Greek drama. Dr. Hadas was elated by the reception of his lectures, and felt that the educational telephone network was an excellent way to fill the need of the student for a broader and better education in a flexible and inexpensive manner.

Cooper, Signe S. and Lutze, Ruth S. "Dial 'N' for Nursing." *Adult Leadership*, December 1970, pp. 178-80.

The Department of Nursing, University of Wisconsin-Extension, Madison, has sponsored telephone conferences for practicing nurses since 1966. The project described in the article is an extension of an ongoing program. Entitled the Wisconsin Inactive Nurse Studies (W.I.N.S.), the project became operational in March 1969. The article gives the background for the project, discusses problem areas encountered in working with inactive nurses throughout the state, and difficulties in implementing the program. All evidence would indicate that the program is achieving its objective: helping the non-practicing professional nurse keep in touch and maintain her interest at a high level.

De Muth, J. E., Arndt, J. R. and Weinswig, M. H. "Attempt to Initiate Community Action Programmes in Venereal Disease Education in the United States of America." *British Journal of Venereal Diseases*, 50, April 1974, pp. 151-54.

"Venereal Disease and Society" was an educational course presented to 168 adults throughout the State of Wisconsin by means of a closed circuit telephone network. The use of Wisconsin's Educational Telephone Network, according to the authors, represents a new and effective approach to venereal disease education. They felt that the importance of the course lay not only in the use of electronic communications, but in its attempt to motivate the students to initiate or advance venereal disease education in their own communities.

"Final Report on Two Inter-Institutional Programs Utilizing Amplified Telephone Communication." Submitted to the Fund for the Advancement of Education, Stephens College, Columbia, Missouri, September 1966.

Stephens College used several new instructional devices in introducing two inter-institutional courses. The undergraduate course, "American Life as Seen by Contemporary Writers," supplemented discussion sessions with poetry readings on audio tapes and lectures via amplified, live telephone communication. The latter device also made possible conversation between prominent literary figures and students at all the participating colleges. Students evaluating the generally very successful course expressed a desire for more depth and less breadth in instructional approach. The course, "New Approaches to the Teaching of Mathematics," employed the Electrowriter, an instrument that transmits written images over telephone cables. The course was successful, but the Electrowriter presented occasional technical problems. Some students expressed a desire for more unity in the course material.

Hartje, George N. "Teaching Library Science and Telelecture." University of Missouri, Columbia, 1973.

An experiment was performed on the use of telelecture, amplified voice telephone, at the University of Missouri-Columbia. The telelecture exposed the students to another academic library administrator, and appeared to be a successful learning experience. Some changes regarding the technical details of telelecture are suggested to improve the use of this new instructional media technique which the author feels is applicable to library science education.

Hartje, George. "The Telephone and Education: A Case Study in Library Science." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

A brief historical summary of the use of the telephone in education is given. The author is concerned with the use of the telephone in teaching the discipline of library science. An example of the telelecture is given. The author's conclusion is, "If our feedback is accurate, the results seem to bear out Kruck and Tversky's contention that telelecture is one of the most effective ways to bring outstanding resource persons to the classrooms." He further concludes that "our experiences prove that with imagination, energy, help, and planning, post secondary education can utilize telelecture in various situations."

Hartung, George and Gelman, Rena. "Something Different in In-Service Education." *Today's Education, NEA Journal*, May 1970.

In 1965, the University of Wisconsin-Extension began offering continuing education programs over the Educational Telephone Network. The English Department of University Extension began its Educational Telephone Network Workshop for English Teachers in 1967. The authors discuss this workshop, other workshop sessions of 1967-68, and programs offered in 1969-70. They also talk about the reaction of participants and lecturers to the telephone courses and give some suggestions for the objectives they hold when planning and organizing English workshops.

Hornback, May S., and Brunchik, Helen L. "Party Line for Nurses." *Nursing Outlook*, 16, May 1968.

This article deals with a Department of Nursing's experiment with the telelecture system as a means to provide continuing education for nurses. The article covers the objectives and the organization of the series. An explanation is given as to how the telelecture system functions for the program "Call Nursing 1966." The article concludes by mentioning the technological improvements that have been made which allow a greater number of nurses to participate in a continuing education program.

Hugdahl, Edward O. "Wisconsin's Wired for Organists." *Hurdy Gurdy*, 4, Jan./Feb. 1976, pp. 26-7.

The author gives an explanation of how Wisconsin's Educational Telephone Network (ETN) was adapted to benefit organists and describes how electronic developments have allowed musical demonstrations, as well as spoken comment, to be transmitted. This flexible arrangement saves travel for the participants and allows talent to have a more widespread impact.

Johnson, Jay S. "State-Wide Education Via Telephone for Wisconsin Clergymen: A Project in Adult Education." Department of Rural Sociology Memo, University of Wisconsin-Extension, Madison, July 1968.

The paper first outlines briefly the University of Wisconsin-Extension services to clergymen during the past half-century, with particular emphasis on changes in recent years. Second, it offers some analysis of the process and the results reported by clergymen-participants in the pilot 1968 statewide telephone series.

Jolly, Joan and Madden, Charles F. "Amplified Telephone as a Teaching Medium: Description for an In-Service Science Seminar." *Amplified Telephone as a Teaching Medium*, Stephens College Educational Report: I, Columbia, Missouri, March 1965, pp. 9-10, 14-15, 36-37, 41-42, 56-58.

"The Improvement of Science Teaching" was a noncredit course coordinated from the Stephens College campus with six other colleges in the network participating. The program was highly successful and demonstrated that even for different types of subjects and for teachers using various instructional methods, the telephone, amplified and provided with additional microphones, can be an effective way of carrying on instructional programs.

Kruck, Donald and Tversky, Arnold D. "Classroom Communication: Telelecture." *Audiovisual Instruction*, February 1971.

The authors discuss their experience with implementing a telelecture program in a Dover, New Jersey high school's social science department. Their main objective was the improvement of education through the use of the telelecture, having outside resource speakers participate in the classroom lesson. They felt that given opportunities to speak with authorities in various fields, the high school students demonstrated higher interest in classroom discussions and were able to develop research skills by preparing questions to be used during the telelecture.

LaZebnik, Jack. "The Amplified Telephone Program At Stephens College." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The author explains how Stephens College in Columbia, Missouri, has used the Amplified Telephone from 1958 to the present, as a means of adding to the substance and range of the classroom. "We have found the procedure highly successful and somewhat disappointing, inspirational and defeating, popular and esoteric, efficient and chaotic, essential and a luxury, worth the money and beyond our means."

L'Henry-Evans, Odette. "Case Study of a Pioneer Scheme for Teleconferencing in London: Open University Course: Faculty of Arts; The Age of Revolutions." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The author explains an experiment in teaching through teleconferencing at the Open University in London. The course (The Age of Revolutions) as used in the article, leads the author to certain conclusions, among them that "Non-visual communication systems . . . have certain recognized instructional advantages over other media; there are factors which make telephone group discussion especially satisfying; and the psychological inhibitions normally resulting from non-visual communications were markedly absent . . ."

Lutze, Ruth. "Inactive Nurses Keep Up With Party Line Classes." *The Capital Times*, Madison, Wisconsin, 20 April 1974, p. 9.

The article deals with how the Educational Telephone Network (ETN) is serving Wisconsin's inactive nurses to keep them aware of the latest trends in health care.

McKenna, Constance and Wiese, Alice. "Home Economics and TeleNet: Yesterday, Today and Tomorrow." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

Home Economics Extension programs, via the Illinois TeleNet System, present diverse subjects of interest to family members both at home and in community settings. The article describes past and present status of TeleNet and potential uses for tomorrow.

Meyer, Thomas. "Communications in Postgraduate Medical Education." *The Alabama Journal of Medical Science*, 7 (2), April 1970, pp. 212-16.

A consequence of the knowledge explosion in the medical sciences is that health care professionals are pressed for time to keep up with developments in their fields. To deal with this problem, the Department of Postgraduate Education of the University of Wisconsin has experimented with three methods of making current pertinent and authoritative information readily available to health care personnel. A dial-access telephone library contains several hundred tapes with information which is relevant to emergencies, to new discoveries, or which is hard to find elsewhere. Single concept medical films are offered to hospitals throughout the state for viewing by staff. Finally, telephone/radio conferences bring lectures and discussions to participating hospitals. All three methods have been widely utilized by professionals in Wisconsin.

Meyer, Thomas C. et al. "An Experiment in the Use of Telelectures for Continuing Education of Physicians and Allied Health Personnel." *Medical Biological Illustration*, 18 (1), January 1968, pp. 18-20.

This report tells of the early (1968) use of telephone conference lectures as a means of continuing education for all the health professions.

Meyer, Thomas C. et al. "Report of an Experiment in the Use of Telelectures for the Continuing Education of Physicians and Allied Health Personnel." *The Journal of Medical Education*, 43 (1), January 1968, pp. 73-77.

The use of telephone conference lectures as a means of continuing education for all the health professions is described. The project proved to be highly popular with physicians and paramedical personnel in community hospitals throughout Wisconsin. The educational effectiveness of such instruction has not been fully evaluated, but on the basis of pre- and post-course examinations it has been concluded that the system shows promise.

Nelson, C. L. and Klavon, A. J. "Extend Your School to the Community and the University." *The Agricultural Education Magazine*, 1974, p. 80.

The article describes the author's experience with "extending" the University of Maryland by phone. Experience both with the University and Easton High School, on the eastern shore of Maryland, illustrated that use of conference phones has great potential at the University levels as well as the local school level.

Parker, Lorne A. "New Media for Police Education." *The Wisconsin Sheriff and Deputy*, 20 (2), December 1968.

The author discusses the history and development of the Educational Telephone Network (ETN) and the Subsidiary Communications Authorization (SCA) of the University of Wisconsin. The author also tells of some of the educational uses to which these systems have been put and speculates on the future uses of ETN-SCA.

Paul, Aldrich K. "A New Concept in Sharing Speech Professors." *The Speech Teacher*, 13/14, January 1965.

This essay focuses on the concept of multiplex transmitting. Multiple transmitting, used intermittently since 1899 with limited success, is now being used by educators with good results. The author discusses some of the methods used by telelecturing participants and lecturers to overcome what he calls an "audience adaptation factor." He concludes by citing and elaborating on four unique advantages of the telelecture technique: cost, availability, flexibility and ease.

Raccoli, Susan. "Technology Makes the Workshop Scene." *Clavier*, March 1974, pp. 31-3.

The author explains how the technology of the Educational Telephone Network has benefited people in Wisconsin with improved efficiency for greater numbers of people without loss of individual contact. Reactions to a Piano Teacher Forum were detailed, and a personal poll taken by the author revealed that the participants were generally enthusiastic about the course and the possibilities ETN presented for continuing education in music. In addition, the program was inexpensive, the course reached a large audience, and the program provided an opportunity for people living outside a metropolitan area to participate in an exciting continuing education program in their field of interest.

Ristau, Robert A. "An Evaluation of the Educational Telephone Network (ETN) as an Instructional Delivery System for a Graduate Course in Career Education." Report of the Center for Studies in Vocational and Technical Education, University of Wisconsin-Extension, Madison, 1 March 1973.

This report describes a program which enrolled 164 teachers, administrators and counselors from Wisconsin schools for a University of Wisconsin graduate extension course. Professional advancement and assistance in developing career educational programs were the primary objectives of most of the enrollees. During the fall semester, the course was taught using the Educational Telephone Network (ETN) statewide facilities with interface sessions which brought several local ETN groups together for the ETN presentation and discussion. In rating the course, nearly half the students evaluated it as equal to or better than the traditionally taught extension courses.

Robin, Harold. "Telephone Network Courses." *Educational Screen and Audiovisual Guide*, 43, March 1964.

The author describes the various classes offered via amplified telephone at Stephens College, Columbia, Missouri, since its inception in 1958. The response to the telephone lectures was enthusiastic, and in tabulating the data from experimental telephone lecture classes against control classes (covering the same studies but without the off-campus speakers), some definite results emerged favoring continued telephone lectures.

Ruffing, Charles. "Michigan Education: Leader in Applying Telecommunication Theory." *Michigan Challenge*, November/December 1975.

The State Board of Education of Michigan has backed the concept of educational telecommunications, and has funded several experimental projects in local school districts. One technique under examination involves the "subcarrier" of an FM radio station's broadcasting signal. In other school districts people are operating videophone networks. The article devotes a paragraph or two to each of the projects taking place in Michigan using these two techniques.

Schwartz, Raymond and McNeely, Richard. "Telelecture: An Adventure in Learning."

The Clearing House, December 1971.

Through the use of the Bell Telephone Telelecture, the students at Dover High School, New Jersey, have been using the telephone to speak with leading political figures about their "points of view." Both students and teachers found the Dover telelecture program to be worthwhile: students felt it changed their attitudes about government, teachers believed that it was an effective way to make social studies "more realistic."

Sparks, James. "Helping Clergy Use Conflict Creatively." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976. (Reprinted from *Adult Leadership*, 24, 6, February 1976.)

The author describes how the University of Wisconsin-Extension addressed the immediate needs of clergy via ETN. (The "immediate needs of clergy," according to the Midwest Career Development Center, Columbus, Ohio, are role confusion, a feeling of isolation, financial compensation, a lack of goal-directedness, the role of spouse in career satisfaction.)

"Spreading the Word on the New Math." *Business Week*, 10 April 1965.

Through a new combination of communication tools--telephone lines and the Electrowriter--experts in modern math have been lecturing from Chicago, Cedar Falls, Iowa and Urbana, Illinois, to 2,250 Iowa parents and elementary school teachers as far away as 500 miles. Financed by a Ford Foundation Grant, local and state education grants and the federal government, the program is officially known as the Northwest Iowa Telewriter Project. The cost of the project was one of its largest advantages: one-thirtieth that of closed circuit television broadcasts of a similar nature. Iowa educators also cite the instructional benefits of the method.

Swan, Sam. "The Educational Telephone System in Missouri: A Case Study." *The Status of the Telephone in Education*, University of Wisconsin-Extension, May 1976.

The author cites an effective example of the use of the educational telephone system at the University of Missouri-Columbia. The program is offered by the Extension Faculty of the Department of Agricultural Economics. The article includes personal observations of those who have used the system.

Villardier, Louis. "Telefun at the Universite du Quebec: (2) Telelogo." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

A technically straightforward but pedagogically innovative course is described. Telephone lines are used to enable teachers around Quebec Province to take a computing course based on the LOGO language. Importance is attached to a communication system which enables students to send messages to the operator-facilitator and also to swap programs and ideas with classmates in other towns.

Witt, William. "Busy Medics Keep Pace: Doctors Go to School by Phone." *Wisconsin State Journal*, 21 March 1966.

The centralized telephone lecture allows doctors to fulfill moral responsibilities to patients while keeping up with current events in medicine. Programs are conducted for an hour and emanate from the studios at the state radio station, WHA, on the University campus. Physicians pay $50 for a series of two dozen lectures. The article lists other programs which currently utilize new communication technology to provide medical information to Wisconsin doctors. The author concludes with mention of programs being planned.

Instructional Design

Arndt, Jack. "Pharmacy Telelectures: An Analysis of Eight Years' Experience in Wisconsin." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The use of Wisconsin's Educational Telephone Network (ETN) for providing continuing education for health professionals in general and pharmacists in particular

is described. Nine courses presented in the past eight years by Extension Services in Pharmacy are analyzed with respect to enrollment fluctuations, to professional specialties of the enrollees, and to attendance patterns of the participants.

Baird, Marcia. "Designing Teleconference Programs: Some Clues from the Wisconsin Experience." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The article illustrates how University of Wisconsin's faculty, using ETN (Educational Telephone Network) systems, have put implications of adult learning research into statewide classroom practice. The author focuses on general guidelines or "ideas to think with" that seem paramount to teleconferencing program design. The focus of the article then shifts to how programmers operationalize those "ideas" into specific techniques for program organizers, formats, discussion and feedback.

Beavers, April. "A Case Study of Organizing for a Telelecture Course or What to do Before the Phone Rings." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

This case study presents the preplanning activities and organizing procedures utilized in the implementation of a statewide telelecture network in West Virginia (Project for Parents Understanding Student Handicaps-Outreach).

Dotterweich, W. W. "Enhancing the Effectiveness of Remote Teaching." *Audiovisual Instruction*, February 1971, pp. 39-41.

The author's experience with remote teaching during the 1969-70 academic year at the University of Tennessee was useful in identifying problem areas and in directing his thinking toward improvements in preparation and presentation. Some observations are presented here in the hope that they might be helpful in enhancing the effectiveness of the remote teaching process and in overcoming reluctance to teach such classes. The advantages and disadvantages of remote teaching by videotape are treated first, and then the supplemental use of the Electrowriter is discussed as a means of overcoming some of the fundamental deficiencies of this technique.

Glueck, William F. "Management Training Using Telelectures." *Training and Development Journal*, 25 (11), November 1971.

After participating in a telelecture program on management training for hospital administrators and middle managers, the author concluded that telelectures have advantages in training individuals at multiple sites simultaneously and, in some cases, economically. In this article, the author discusses what telelecturers are, the content and methods used, the difficulties and advantages of the method and some possible uses in other organizations.

Hartje, George N. "Utilizing Telelecture in Teaching." *International Journal of Instructional Media*, 1 (3), Spring 1974.

This paper describes the steps involved in the use of telelecture for a unit of a graduate course on the academic library. The paper enumerates the necessary techniques, indicates the relationship of telelecture to media technology and learning, and gives a brief resume of telelecture in college teaching. It was learned that careful preparation is necessary in using telelecture for a successful learning environment.

Heiliger, Edward M. "Teaching Information Retrieval Using Telediscussion Technique." Center for Library Studies, Kent State University, Ohio, 1972.

This paper concerns an experiment in teaching a graduate seminar on Information Retrieval using telediscussion techniques. Outstanding persons from Project INTREX, MEDLARS, Chemical Abstracts, the University of Georgia, the SUNY biomedical Network, AEC, NASA and DDC gave hour-long telelectures. A Conference Telephone Set was used with success. Student diaries and an observer provided part of the background material for this paper. Recommendations are given for future course design.

Hugdahl, Edward O. "A Communications System Serving the Continuing Education Needs of the Piano Teacher." *The American Music Teacher*, February/March 1976.

In 1973 came the idea of using a communications system, Wisconsin's Educational Telephone Network (ETN), to provide a state-wide two-way communications system in music. Never before had music been programmed on ETN. The experimental program, the Piano Teachers Forum, was set up and was successful, for the ETN system eliminated location and travel schedules and opened up possibilities for drawing upon teaching and performing talent. The author briefly explains how the ETN system works and discusses how a few of the musicians have adjusted to broadcasting on this unique system. He concludes the article by listing the stages he feels are necessary to most effectively utilize this communications system.

Hugdahl, Edward. "Utilizing Teleconferencing for Music Education." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

By utilizing a communications system like the University of Wisconsin-Extension Educational Telephone Network (ETN), music education can venture into new frontiers of programming which have tremendous potential. Adult and extension music education can now have a state-wide impact which the traditional and conventional forms of delivery, such as local, regional and state workshops and classes, can never achieve. Further, such a communications system makes it possible to achieve programming involving internationally celebrated artists and universally acclaimed authorities which can be afforded in no other way.

Krietlow, Burton W. "Tuskegee, Are You on the Line?" *Adult Leadership*, November 1974, pp. 133-4.

The author opens with a brief explanation of how the Educational Telephone Network functions. The main concern of the author is with the teaching problems he experienced with the ETN system, and he gives a seven-item list of suggestions for making teaching on the network productive. Selected 1972 and 1974 class responses were given to illustrate the positive change in student reaction to classes on ETN that has occurred.

Lemberger, Max, Balanoff, Neal and Siegel, Betty. "Educational Telephone Network: English Faculty and Foreign Population." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The authors describe the development of a course of foreign pharmacy graduates through ETN. They conclude: "It is possible now to educate a large number of students in a language that the instructor cannot speak. This opens the way to education for many national groups in the United States who are unable to practice their profession because of licensing restrictions."

L'Henry-Evans, Odette. "Teaching by Telephone: Some Practical Observations." Paper presented at the conference on teaching by telephone held by the Open University, Westfield College, London University, April 1974.

Most Open University tutors are used to giving tutorial help to individuals by telephone. Recently, a number of experiments have been set up to link more than two individuals at a time. One of the methods is a 'conference call' where up to eight people can share in a conversation from their own homes. Dr. Odette L'Henry-Evans is a Senior Lecturer in French Language and Literature at the Polytechnic of North London, and a part-time Open University tutor in arts. She writes from her experience of running telephone tutorials.

McKay, Gerald R. "Teleteaching--The Party Line Revived." *Audiovisual Instruction*, May 1971.{Also: Extension Service, Review, 41 (11), November 1970.}

Minnesota used telelecture for 59 meetings, reaching 296 groups in 35 counties. The experience showed that this type of meeting can be successful, but that the person in charge of each group must have careful training on the receiving equipment.

They found it important that the speaker carefully adapt his message to his particular audience. In most cases no speaker talked longer than 20 minutes without a break for questions or local discussions within the groups. In all but one meeting visuals were prepared for each speaker and sent to the group ahead of time.

Meyer, Thomas C. "The Role of Telephone Technology in the Continuing Education of Health Professionals." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

Ten years' experience in utilization of instructional technology in continuing education programming at the University of Wisconsin is reported. Specific media and methodology used include telephone conference, dial access library and slow scan television, with attempts at evaluation of each described. The experience indicates that more attention must be given to identification of educational needs, deficiencies in medical school training programs, and evaluation of end results before optimum use of educational technology in continuing education is possible.

Miller, LaVerne. "Teaching with the Telephone--A Classroom Instructional Tool in a Community College." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

Professor Miller discusses the elements involved in structuring a telelecture course, a kind of how-to-do-it approach, by describing a methodology "which seemed to work." She concludes that the most important lesson the telephone lecture taught her is that the "medium must be integrated into instruction in such a way that it is either the warp or woof of the learning action, whether it is television, films or the telephone." She also supplies a list of "Some Telelecture Guests."

Monson, Mavis. "A Report Investigating Teaching Techniques Used Over the Educational Telephone Network, University of Wisconsin-Extension." *A Design for Interactive Audio*. University of Wisconsin-Extension, Madison, 1977.

This report represents a study of teaching techniques with respect to a telephone-based instructional system--the Educational Telephone Network of the University of Wisconsin (ETN). Field research was used to gather basic data on the techniques being used. The author attempts to determine common characteristics of the approaches used by various instructors in their planning for ETN programs. Theories of communications, learning and adult education were surveyed and any informal correlations between actual practice and accepted theory are noted. Some general guidelines with respect to planning for ETN programming are summarized.

Monts, Elizabeth A. and Peterson, Bernadine H. "Graduate Teaching by Telephone and Radio." *Journal of Home Economics*, 61 (6), June 1969.

A graduate course in home economics education was taught by means of telephone and radio to a group of home economics teachers meeting at an off-campus center. A control class met on campus with the instructors present. The study sought to answer the question: Is it possible to present a graduate course effectively without the presence of the instructor in the classroom? Overall evaluation of the course by students in both groups indicated a positive point of view. Mechanical aspects were a problem for students, especially those in the experimental group who also continued to miss the physical presence of the instructor. Their pilot study offers findings and recommendations useful in developing off-campus offerings by means of educational technology.

Parker, Lorne A. "Effective Teaching Techniques for Educational Telephone Network Instruction." Paper presented at demonstration workshop, Fort Gordon, Virginia, April/May 1975.

The author briefly covers the development of ETN, explains the use of the station equipment, and discusses the cost of the educational telephone network. The major thrust of the article is to discuss some of the effective teaching techniques that are built

into the design of instructional programs transmitted via the telephone system. Research on teaching via telephone is given, and the author gives some suggestions for effective usage of the telephone in education. This report also includes evaluation highlights and summary of an ETN experiment with the Army.

Parker, Lorne A. and Baird, Marcia A. "Humanizing Telephone Based Instructional Programs." Departmental Publication, University of Wisconsin-Extension, Madison, November 1975.

In this paper the authors focus on some of the personalizing, discussion and teaching techniques that are built into the design of long distance Educational Telephone Network programs. The paper includes a brief explanation and description of Wisconsin's Educational Telephone Network.

Paulson, Robert L. "Tel-A-Lecture Technique." *Educational Screen and Audiovisual Guide*, 42, June 1963.

The article describes how the members of the Iowa Audio-Visual Association were introduced to a new instructional technique. Educators at the Malcolm Price Laboratory School, State College of Iowa, Cedar Falls, were shown how it was possible to adapt audiovisual techniques to a conference problem. The article also discusses the ongoing projects at the school concerning telephone amplification for classroom instruction. It concludes with principles learned from the project which the authors feel seem to be evident and which can help other educators concerned with implementing telephone-based equipment into their curriculum.

Schrieber, David. "Improving Communication Effectiveness Over ETN." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

This paper examines the concept of communication within the context of the Educational Telephone Network and discusses why sometimes communication does not take place, and what can be done to improve the odds of effective communication when using ETN media. The primary objectives of the paper are directed at helping "educators or communicators become aware of some of the pitfalls in communication via ETN and to become interested in some of the possible actions which can be taken to avoid or overcome these pitfalls . . . and to encourage educators to experiment a bit with some of these concepts next time they venture into the world of ETN."

"Suggestions for Effective Tele-Lecture Presentations." American Telephone and Telegraph and Associated Companies, Morristown, N.J., April 1968.

This brief handbook presents some helpful hints to telelecturers, particularly those persons participating in the amplified telephone conversation for the first time, so that they may feel confident and effective in the telelecture situation. Suggestions are also made for those persons responsible for setting up the telelecture and for those who may serve as conference moderators.

Tucker, Thomas T., et al. "Seminar by Amplified Telephone: A Report and Evaluation." Nevada Western States Small Schools Project, Nevada University, Reno, 1968.

A pilot program is outlined which explored one possible way by which teachers in small schools might have access to quality in-service education. The use of the amplified telephone and the conference bridge technique is described. A general description of the course (a cooperative effort of the Western States Small Schools Project and the University of Nevada) is presented, including content, requirements and method. An evaluation of the course considers content, method of presentation, on-site situations and participant comments. Conclusions and recommendations for improving the program complete the document.

Wakefield, Lucille M. and Vaden, Allene G. "Nutrition Course for Elementary Teachers by Telephone (Telenet)." *Journal of Nutritional Education*, 5 (3), July-September 1973.

Telenet was used in Kansas to respond to the challenge of the White House Conference on Food, Nutrition and Health to upgrade nutrition education knowledge of teachers. As an outgrowth of this course, a nutrition education course for elementary teachers has been added to the curriculum of a four-year, teacher training, denominational college in Kansas. In addition, Kansas State University, Department of Foods and Nutrition, and Dairy Council, Inc., of Greater Kansas City sponsored a college credit nutrition education course for teachers in Title I Schools in Topeka, Kansas.

Walsh, L., et al. "SCA and ETN Procedures and Guidelines for Use by University Extension Specialists in Projects III, IV and VII." A Preliminary Report to the Extension Projects III and IV Advisory Committee, University of Wisconsin-Extension, Madison, February 1968.

The purpose of the report is to give guidelines and suggestions for the new media--Educational Telephone Network (ETN) and Subsidiary Communications Authorization (SCA). The paper explains how the systems work, identifies their communication characteristics, and explores the potential of the ETN-SCA systems. Examples are given as to how to develop, prepare and deliver presentations for ETN-SCA.

Wentorf, Dorothy. "Report on Organization Theory Course, 1974-75." Given in Conference and Phone Seminar Format, University of Wisconsin-Extension, Madison, 4 November 1975.

The Organization Theory course was presented through a combination of conference telephone and Saturday seminars. The survey which formed the basis of the evaluation was returned by a total of 110 students at the close of each semester, 55 each time. This represents about 70% of the students who enrolled in the course and a higher percentage of those who actually finished the course. The report opens with conclusions based on results from student evaluations and on recommendations made by instructors. The methodology of the evaluation method was given and significant specific course features were detailed. The results indicated that learning does take place. However, there is a substantial resistance to this kind of instruction both on the part of the instructors and students.

Wentorf, Dorothy and Adams, W. Sam. "Mediated Graduate Instruction--Does It Work?" Unpublished Manuscript, August 1973.

Offering a Management Foundations course over Wisconsin's Statewide Extension Education Network (SEEN) provided an opportunity to test a relatively new media technique. The report seeks to answer how useful this technique is in delivering a course of this type to students geographically scattered throughout the state of Wisconsin, to participants who are diverse in age, years of business experience, and educational background. In addition, it attempts to find what factors, if any, relating to the equipment, facilities or instructional techniques appeared to be important to their academic performance or reactions to the course. Lastly, the report offers recommendations to be used for future programming.

Research

Bailey, G. C., Nordlie, P. G. and Sistrunk, F. *Teleconferencing: Literature Review, Field Studies, and Working Papers*. Institute of Defense Analysis, Research and Engineering Support Division, Human Sciences Research Inc., October 1963--Revised March 1966.

The purposes of this report, based on a three-month study, are to (1) identify propositions from past research which have potential applications for teleconferencing procedures and facilities; (2) identify social and psychological variables which need to be taken into account in the evaluation of teleconferencing; (3) suggest alternative arrangements; (4) formulate hypotheses from the information collected about relationships among variables in the teleconferencing situation; (5) identify and describe a rationale for criterion variables which might be used in experimental studies. It is the general objective of this study to assemble

and review information relevant to teleconferences and teleconference research and to draw implications therefrom for the long range teleconference research program. This report is an overview of the results of the three-month study. It is supplemented by a series of Working Papers which contain greater technical detail on various special topics.

Blackwood, Helen and Trent, Curtis. "A Comparison of the Effectiveness of Face-to-Face and Remote Teaching in Communicating Educational Information to Adults." Cooperative Extension Service, Kansas State University, Manhattan, October 1968.

Blackwood and Trent evaluated 71 students divided into two groups by means of random sampling. Pre-tests and post-tests were given simultaneously to two groups--the 34 control students who were taught in the traditional method, and the 37 students who were instructed by telephone. Results showed no differences in the amount of learning between the two groups and no differences depending on varying educational levels among the students. Attitudes for both groups were similar, but they did observe students aged 35-44 were more positive to remote teaching, while those 45-64 liked face-to-face instruction better.

Boswell, John J. and Mocker, Donald W. "Remote Teaching at the University of Missouri, St. Louis." Unpublished Manuscript, University of Missouri-St. Louis.

This paper explains how educational telephone and Electrowriter systems work and tells of a research project conducted at the University of Missouri, St. Louis. The study was designed to determine the effect of the hardware on a simultaneous class and to determine the efficacy of the technique for remote teaching. Three groups of students were involved: the first was a control group which received a traditional lecture; the second group, also in St. Louis, was a control group which received a live lecture which was simultaneously transmitted to a third group in Flat River, Missouri. The results showed no difference among pre-test scores, post-test scores or behavioral observation data. The students' response to the teacher-class evaluation forms also failed to show systematic differences among the groups.

Boswell, J. J., Mocker, D. W. and Hamlin, W. C. "Telelecture: An Experiment in Remote Teaching." *Adult Leadership*, 16 (9), March 1968, pp. 321-2, 328.

The paper is concerned with the question of whether or not remote teaching can produce results comparable with those observed on the home campus following traditional lecture methods. Three classes of introductory psychology were involved. One group was a control group (n = 64) which received a traditional lecture on the home campus. The second group (n = 63), also on the home campus, received a live lecture which was simultaneously transmitted to a third group (n = 22) located in a remote classroom. The results of the pre-test and the post-test showed no differences among the groups.

Boyd, Gary. "Game-Plans and Reward Structures for Teleconferencing." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The author offers a theoretical treatise of the underlying psychological and sociological interactions of teleconferencing. The hypothesis is related in terms of game theory.

Brendel, Philip J. *Incasting and the Telephone Network*. Center for Policy Research, Inc. New York, January 1972.

Incasting is the inward flow of information from many participants to a central destination. This paper describes the nature of incasting and to what extent it may be executed by using the telephone system. A new incasting network is proposed which is superimposed over the existing telephone network, and it is shown how the two networks augment each other.

Burkhart, James A. *An Experiment to Determine the Values of Using Amplified Classroom Telephone Interview with Sig-*

nificant Individuals to Enrich Certain College Courses. Stephens College, Columbia, Missouri, 1960.

An office telephone with an attached amplification unit and an auxiliary microphone telephone were used in four different college courses for regularly scheduled interviews with prominent individuals. A one-year experiment utilized an experimental section and a control section for courses in American Government, Modern Business, Philosophy and World Literature. Experimental sections were taught by regular methods, but with the addtion of a telephone interview which was either 1) student-centered with a short instructor "warm-up" for the interview, or 2) teacher-centered with student questions following a 20- or 30-minute instructor interrogation during the interview. Pre- and post-tests consisted of an inventory of beliefs and a knowledge test. In the one course in which complete testing was accomplished, the experimental group made significantly higher scores than the control group.

Casey, Anna E. and Havron, M. Dean. "Human Needs in Teleconferencing." *Audio-Visual Communications*, April 1974.

Human Sciences Research has conducted studies on teleconferencing for the Canadian Department of Communications. Users of two audio and two audio-video teleconference systems were interviewed and systems were observed and described. Results, while preliminary, suggest that: 1) Teleconferencing can play an important role in government and business communications; 2) Engineering of satisfactory teleconference systems is--for the most part--well within the state of the art; 3) Organizational, social and personal factors are quite important to the efficiency and continued use of teleconference systems. This paper describes constructs needed to understand "people variables" involved in teleconferencing, and how they influence system performance and user satisfaction.

Casey-Stahmer, Anna E. and Havron, M. Dean. *Planning Research in Teleconference Systems*. Human Sciences Research, Inc., McLean, 28, September 1973.

The study represents a joint effort by the Human Sciences Research of McLean, Virginia and scientists of the Social Policy and Programs Branch of the Department of Communication. Its primary purpose is to establish a rationale and guidelines for determination of research priorities in teleconferencing. Data were obtained by developing a grid or map to organize teleconference system dimensions and attributes as seen by users, and by interviews with users of four teleconference systems. The authors suggest that: 1) Variables associated with interaction between terminals are more important to users than static factors; 2) Audio-video systems are only moderately or marginally superior to audio systems that include telegraphics (this depends in part on conference tasks); 3) Variables of the personnel or subsystem are extremely important; they determine in large part whether systems work and whether they continue to be used. The authors also give their suggestions as to what areas need research attention.

Champness, Brian G. "Attitudes Towards Person-Person Communication Media." *Human Factors*, 15 (5), October 1973, pp. 437-47.

Several recent experiments in fields such as bargaining, opinion change and problem solving have employed the medium of communication as an independent variable. This study was designed to investigate attitudes toward three media: face-to-face, loudspeaking audio and closed-circuit television. Thirty-six pairs of managerial civil servants engaged in three six-minute discussions, one via each medium, in a completely controlled design. After each discussion, subjects completed a 24-scale, semantic differential, media-attitude questionnaire. There were significant effects of the media upon 20 of the 24 scales.

Champness, Brian. *The Perceived Adequacy of Four Communication Systems for a Variety of Tasks.* Communications Studies Group, Joint Unit for Planning Research, University College, London, November 1972.

The aim of the experiment was to test a questionnaire which was designed to measure the extent to which users perceive a system to be satisfactory for a variety of purposes. This instrument measured cognitive, rather than affective components of attitudes. One hundred and twelve managers on a Civil Service training course conversed in pairs over one of four communications media: face-to-face, loudspeaking audio and two closed-circuit television systems. There were statistically significant differences for media on 15 of the 19 scales. Factor analysis of scale scores produced four factors: interpersonal relations, factual information, conflict and general discussion. In general, only face-to-face was satisfactory for interpersonal relations and all media were satisfactory for factual information, while video systems and face-to-face were believed to be satisfactory for conflict.

Chan, Paulina. "A Model of Some Psychological Factors in Teleconferencing, Including Social Relationships, Participant-Satisfactions and Group Performance." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

This paper is concerned with ways of analyzing group behavior and interaction patterns in teleconferencing. Its features can be interpreted in terms of an Equilibrium Model which consists of two interacting subsystems: The *Conference Activities Inventory (CAI)* and the *Users' Behavioural Needs (UBN)*.

Chan, Sui-Wah and Messick, Jim. "Telecommunications Projects in Medical Education and Health Care." Unpublished manuscript representing an introduction to a more extensive report, Office of Medical Education, Research and Development, Michigan State University, East Lansing, November 1974.

This paper is an attempt to survey projects which have utilized or plan to utilize interactive (two-way) communication technologies to assist in solving problems commonly referred to as the shortage and maldistribution of physicians and health care services. The paper gives a listing of the projects, followed by one paragraph descriptions of each project. The paper represents condensed and greatly capsulized information which serves only as an introduction to a larger survey which will be made available for distribution from Michigan State University's Office of Medical Education, Research and Development.

Christie, Bruce. *An Evaluation of the Audio-Video Conference System Installed in the Department of the Environment.* Communications Studies Group, Joint Unit for Planning Research, University College London, November 1973.

A two-way audio-video system was installed and operated between two parts of the Department of the Environment for approximately one year. During that time it was used by only two groups, one of which only used it once. The present report examines why it was not used more. Several factors are isolated which appear to have worked against the use of the system. Of these, poor publicity and the convenience of travel seem to have been the two major factors. However, careful examination of the interview and questionnaire data available suggests that the usefulness of the system would have been limited in any case to audio-oriented, symmetrical, non person-oriented groups in which the members were well acquainted with each other. In this light, it is difficult to justify the use of a visual channel, expecially over short distances. The real need seems to be for a conference system with a high quality audio component and a facility for the rapid transmission of graphics and text.

Christie, Bruce. *Teleconferencing: Predicting the Level of Use.* Communications Studies Group, Joint Unit for Planning Research, University College London, December 1974.

A program of experiments has been initiated to examine the contextual factors which influence the choice of communication mode. Results so far support hypotheses developed in the field that the degree

of acquaintance of the participants, the content of the discussion, and the convenience of the travel alternative, all affect the individual's decision. His attitude towards the teleconference system is also important, and may be more important than the nature of the system itself. It is also clear that these factors interact with each other.

Christie, Bruce. *Travel or Telecommunicate: Some Factors Affecting the Choice.* Communications Studies Group, Nordic Working Party on Conference Telephony, 1975.

Forty-eight senior civil servants used either a two-way television or two-way audio-only teleconference system to hold a simulated business discussion. Following this experience, each subject then decided whether he would 'travel' or 'telecommunicate' in each of the 16 cases. The subjects who had experienced the television system were significantly more likely to choose in favor of telecommunication than those who had experienced the audio-only system. The number of strangers involved in the discussion, and the cost of teleconferencing, each had a significant effect for both types of system equally. The time involved in meeting face-to-face, and the content of the discussion, each had a significant effect only for the television system. The confidentiality of the material discussed did not have a significant effect, but this was probably due to the instructions given the subjects. The results are discussed and interpreted.

Cook, Thomas C. "Tel-Lecture." *Adult Leadership*, May 1963.

The author writes of a May 3, 1962, telelecture presented at LaCrosse State College by Dr. Max W. Carbon, Professor of Mechanical Engineering at the University of Wisconsin. His topic: "The Nuclear Reactor; Its Function and Purpose." An evaluation of the course indicated that the audience had little difficulty hearing and seeing the entire program. All respondents felt the telelecture to be either a "Very Effective" or "Effective" method of teaching and learning. Sixty-six percent of the respondents felt it was "As Effective" as a lecture "in person," 25% felt it to be "Less Effective." The author felt this might be attributed to the newness of the technique. The author concludes the article with six guidelines for planning future telelectures.

David, Austin, F. S. C. "ITV, Telephone, and Computer as Instructional System--A Feasibility Study," *AV Communication Review*, 21 (4), Winter 1973.

In 1966, the Catholic Schools in the Diocese of Brooklyn, with technical assistance from IBM, began experimenting with the use of computer controlled voice-response units for educational purposes. The objective of the research was to link ITV, the telephone and the computer into a unified system of instruction. The author concludes that the three were successfully linked to provide an interactive retrieval system useful in the instructional process. The technological feasibility of using an ordinary telephone to control a computer and ITV broadcast was clearly demonstrated, although the costs for this prototype system would have to be greatly reduced before such a system would be economically feasible.

Dilley, J., Lee, J. L. and Verrill, E. L. "Is Empathy Ear-to-Ear or Face-to-Face?" *Personnel and Guidance Journal*, 50 (3), November 1971.

If counselor and counselee cannot see each other, is the quality of their relationship affected? This study compares the empathy ratings of trained and untrained counselors in three different situations: counseling by telephone, in a confessional-type arrangement and face-to-face. Although trained counselors scored significantly higher empathic understanding ratings than untrained counselors, there was little difference among the ratings for the three methods used.

Edelman, Lily. "Teaching Adults via Tele-Lecture and Electrowriter (Victor Electronic Remote Blackboard)." Commission on Adult Jewish Education, B'nai B'rith, Washington, D. C., May 1967.

This project tested whether the telelec-

ture and Electrowriter could (1) be used effectively for the simultaneous instruction of adults in multiple remote areas, and (2) be used by a master teacher to provide learning experience for adults which is at least as effective as face-to-face instruction. The 'Master' teacher in Chicago taught Hebrew simultaneously to telelecture groups in Grand Rapids and East Lansing, Michigan, and to the 'live' control group in Chicago for nine sessions of one hour each. Each of the experimental classes was originally made up of a minimum of 20 students who had no prior knowledge of how to read or write Hebrew. A similar control group originally had 40 students. An analysis of scores on a midterm and a final examination, and on an oral reading test indicated no significant differences between performances of the three groups. The presence or absence of the instructor from the classroom did not affect the performance on any of the criteria.

Ewbank, H. L. and Baker, E. E. "Tele-Lecture or Traditional Lecture?" *Journal of Cooperative Extension*, Spring 1968, pp. 46-51.

In an attempt to minimize travel and make the best use of time, some extension personnel have tried telelecture, a technique which brings the speaker to the audience via an amplified telephone call. But how does an audience react to such a lecture as compared to one delivered in person? Will a traditional-lecture audience be able to recall more information than will one exposed to information by remote control? To answer these and other questions, a study was made of a telelecture audience as compared to a traditional-lecture audience. The authors present the conclusions and discuss the implications for adult educators.

Feravolo, Mary G. "Investigation of the Effects of the Telephone in Causing Positive or Negative Factors in the Study Habits of Female College Students in an Urban University." *Journal of Educational Research*, 57 (3), November 1963, pp. 152-53.

The purpose of this survey was to determine whether or not the telephone causes positive or negative factors in the study habits of female college students in an urban university. An analysis was made of the amount of time female college students spent talking on the telephone through the school week (Monday through Friday). One of the main points of this survey was to determine how much time spent talking on the telephone was devoted to the discussion of class assignments and school work. After compiling statistics, and reporting statistics pictorially on a graph, the results showed roughly that approximately one-half of the time the subjects spent talking on the telephone was involved with the discussion of school work.

Flinck, Rune. "Teletutoring in Distance Education." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The author describes a research project at the University of Lund in Sweden (Department of Education). The main aim of the project is to study the importance of two-way communication in distance education and how this two-way communication can be reinforced.

Gartrell, J. W. and Mendenhall, Nicole. *Attitudes Towards Changes in Communications Technology: The Introduction of Teleconferencing*. Communications Research Centre, Department of Communications, 1280, Ottawa, October 1975.

A questionnaire survey was conducted in the regional offices of the Department of Communications in the summer of 1974 to determine the attitudes and perception of managers towards the installation and usage of an audio teleconferencing system. These data were compared with results obtained from a previous survey conducted at headquarters. The following results were obtained: 1) regional respondents indicated more positive attitudes towards the introduction of teleconferencing than headquarters respondents; 2) the perceived need and utility of teleconferencing facilities were higher in the regions than those reported by headquarters respondents; 3) respondents of both samples do not perceive the possible

effects of this medium on communication behavior; 4) both samples indicated a need for audio-graphics or audio-visual facilities to conduct their meetings.

George, D. A., Coll, D. C., Paterson, S. A. and Guild, P. D. "Video Via the Telephone," supplement to *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

Three major applications of the telephone in the delivery of video in support of "teaching at a distance" are discussed in this paper: 1) the telephone as a support device providing interaction, or feedback, from student to lecturer; 2) using the telephone system itself to carry signals for graphic displays; 3) the possibility of compressed video signals being transmitted over systems with bandwidths much less than required by conventional television.

Griver, Jeanette A. and Robinson, Margot B. "Centralized Training for Personnel in Remote Locations." *Human Factors*, 11 (2), April 1969.

A training approach for off-site personnel was developed and tested. In an earlier study the approach had successfully reduced communication errors among purchasing agents in the procurement division of a major aerospace firm. The total approach to motivation, communication and learning devised at the main plant was modified and extended to improve job performance of personnel in remote locations. Its applications resulted in a level of learning comparable to that of the on-site personnel.

Holloway, Sue and Hammond, Sandy. "A Study of Users' Reactions to Two Telephone Teaching Systems at the Open University." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The authors describe the background, the methods used and the results obtained from a pilot study by the Communications Study Group, University College, London, using two types of tutorials: the conference call (enabling students to attend a tutorial without leaving home) and the Loud-Speaking Telephone tutorial (LST-4, which enables the *tutor* to stay at home.)

Holloway, Susan and Hammond, Sandy. *Tutoring by Telephone: A Case Study in the Open University*. Communications Studies Group, Joint Unit for Planning Research, University College London, January 1975.

This report concentrates on a survey of users' reactions to two group audio systems at present being used on an experimental basis by the Open University. The North London Telecommunications Project was set up in early 1973 to look into the feasibility of running tutorials over group telephone systems. The conference call facility, linking up to eight subscribers through their own telephone lines has been used for 'remote' tutorials, and at study centres the Loud Speaking Telephone (LST4) has been used to link groups of students with 'remote' tutors. A small sample of users of both systems were interviewed at length to find out reactions to the systems and to assess the potential usefulness of the systems.

Johansen, Robert. "Pitfalls in the Social Evaluation of Teleconferencing Media." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

"How will new media affect the way people communicate?" This is a long range question of social impact. The current state of social evaluation efforts is characterized by a lack of integrating theoretical perspectives. However, the growing number of evaluation efforts are at least serving the important function of highlighting potential pitfalls. These pitfalls suggest more sophisticated approaches soon to be developed. The author cites six pitfalls and draws several overall conclusions from an analysis of these pitfalls that serve as the basis for the future design of evaluations. He states that his conclusions are "suggestions" and are intended to encourage the development of more sophisticated approaches. They will need to be revised and expanded as the social effects of group communication through electronic media become more fully understood.

Jull, G. W., McCaughern, R. W., Zalatan, A. W., Tassie, A. S. and Storey, J. R. "Research Report on Teleconferencing." Unpublished manuscript, Research Sector, The Economic Policy and Statistics Branch and Government Telecommunications Agency, Toronto, September 1975.

This report presents results, conclusions and recommendations arising from a three-year study of the potential of teleconferencing as a service to improve the effectiveness of communications within federal government departments. It has been found that teleconferencing is feasible and can be very useful as an aid to communications between decentralized units, but all available systems have major technical limitations.

Jull, G. W. and Mendenhall, N. M. "Prediction of the Acceptance and Use of New Interpersonal Telecommunications Services," supplement to *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The authors report on studies concerned with the acceptance and use of teleconferencing and its application to management and administration. Surveys of attitudes of users and laboratory studies were carried out. Results identified factors which have an important influence on acceptance and use of the Canadian Systems which include government, university and private sector applications. Factors identified include: organizational communications needs, attitudes towards teleconferencing systems, the convenience of the travel alternative, satisfactory technology and acquaintanceship.

King, Franklin J. "A Study to Ascertain the Feasibility of Incorporating Telelecture in Presenting a Teaching Methods Course." University of Missouri, Columbia, U.S. Department of Health, Education, and Welfare, Office of Education, Bureau of Research, February 1971.

Three methods of teaching an in-service teacher education course, "Principles of Teaching Industrial Subjects," were compared for their influence on informational achievement, teaching performance, attitude toward the course, method of presentation and cost. Fifty-five vocational teachers were divided into three groups, each taught during a semester by one of the following methods: telelecture each week, alternate weeks of telelecture and traditional face-to-face lecture-discussion, or face-to-face lecture-discussion each week. Analysis of pre- and post-tests showed no significant differences among the three groups in achievement, performance or attitude. However, the telelecture is more economical in instructor costs and travel time and is recommended as a means of teaching professional extension courses. The post-tests--a midterm exam, final exam, and the rating scale used to evaluate video taped performance tests--are appended.

Kite, Richard W. and Vitz, Paul C. "Teleconferencing: Effects of Communication Medium, Network, and Distribution of Resources." Institute for Defense Analysis, Research and Engineering Support Division, March 1966.

This exploratory research focuses on the definition of problems that may be associated with the use of various communication media for teleconferencing. The first section describes an experimental task developed to elicit negotiating behavior. In Section II, the results of negotiations conducted over three different media are discussed. Section III presents the results of experiments in which the size of the negotiating group and the networks of communication were varied. Section IV is concerned with the question of how differences of economic power within an alliance affect the amount of conflict in negotiations over the allocation of economic resources, and Section V presents a summary and conclusions.

Knudsen, James, G. and Stone, Solon A. "Use of Telelecture and Electrowriter Systems to Teach Engineering Courses." Oregon State University, Corvallis, July 1971.

A study was made to determine the feasibility of teaching a graduate course in engineering using the Electrowriter. In general, although off-campus students performed as well as on-campus students taking the same course, the students much pre-

ferred the face-to-face contact type of course. The material which must be presented visually in a graduate course seemed to be too much for the Electrowriter to handle with ease. On the basis of students' comments, several suggestions were made for improving the remote course.

Parker, Lorne A. "A Study Comparing the Effects of Compressed Speech Programs with that of Normal Speech Programs Transmitted Via the Educational Telephone Network (ETN) to Professional Adults Throughout the State of Wisconsin." Unpublished Doctoral Thesis, the University of Wisconsin, Madison, May 1972.

This study compared the effects of a compressed speech program transmitted via the Educational Telephone Network (ETN) System on various professional adult groups throughout Wisconsin with that of a program transmitted at normal speech. It is concerned with the noise source, receiver and destination aspects of the Shannon Weaver Communication Model. The relationship of compressed speech lectures transmitted via the ETN system are discussed using the Shannon-Weaver theory. A total of 206 students enrolled in two continuing educational programs are used. Each lecture was taped twice. The normal version of the tape was recorded at approximately 125 wpm, and the compressed version was recorded at 275 wpm. Conclusions are listed.

Pellet, Vernon L. "The Comparative Effectiveness of the Educational Telephone Network and Face-to-Face Lectures for University Extension in-Service Training." Unpublished Doctoral Thesis, the University of Wisconsin, 1970.

The author compared the effectiveness of lecture presentations through the use of the Educational Telephone Network (ETN) and face-to-face situations of conventional district in-service training meetings for county Extension agents and explored implications for the selection of in-service training media. Conclusions include the following: ETN can be an effective medium for communicating cognitive knowledge for Extension in-service training; improvements could be made in the operational procedures used and the quality of ETN transmissions; and the degree of open-mindedness does not appear to be a significant factor to consider in the selection of ETN for in-service training.

Peterson, Bernadine H. "Adult Education by Means of Telephone." Paper presented at the Adult Education Research Conference, Minneapolis, Minnesota, February 1970.

Using a graduate credit and a noncredit home economics course, this study of the University Educational Telephone Network (ETN) investigated whether telephone instruction can be effective in adult education, and how adults would react to this medium of remote, off-campus extension teaching. The graduate course was divided between an experimental group (telephone) and a control group (on campus, face-to-face instruction). The ETN noncredit seminar consisted of three two-hour sessions, one a week. Tentative evaluations concluded telephone instruction is useful for persons scattered over wide geographical areas, and its use should be further refined, expanded and evaluated.

Puzzuoli, David A. "A Study of Teaching University Extension Classes by Tele-Lecture. West Virginia University, Morgantown, August 1970.

After an overview of literature on telelecture models, a study was made of the applicability of teaching university extension courses by telelecture and Electrowriter. At West Virginia University, courses in mining engineering and in modern mathematics were given to college classes (control group) and also teaching telelecture and Electrowriter, to Extension classes in Beckley, 265 miles distant (experimental group). Comparative analysis of the achievement of the two groups, using the T-Test and F Ratio, showed that achievement by the Extension classes was equal to, or significantly greater than, that of students in the on-campus classes.

Reid, A. A. L. "Channel Versus System Innovation in Person/Person Telecommunications." *Human Factors*, 15 (5), 1973, pp. 449-57.

Eight system characteristics of a telecommunications device are identified and discussed: they include penetration, cost, access, search, attitude, ancillary, storage and coordination characteristics. The author argues that improvement in each of these would produce real benefits in terms of increased communication effectiveness. If proposals for channel innovation (such as the introduction of videotelephone) are to be justified, it is necessary to demonstrate that they would yield correspondingly valuable benefits.

Reid, Alex. "New Directions in Telecommunications Research." Report of the Sloan Commission on Cable Communications, Alfred P. Sloan Foundation, New York, June 1971.

Telecommunications research has been focused mainly on technology. Now research about the human factors is crucial. This can be divided into four areas. (1) The needs telecommunications must satisfy--needs can be extrapolated from current behavior. (2) The technological alternatives available--important developments are being made in transmission and switching equipment and user terminals. (3) The effectiveness of the alternatives for meeting the needs--studies should combine the laboratory and outside world and should focus on typical consumers as well as business users. (4) The secondary effects--impact studies are difficult and usually begin after the impact has been felt. An impact study approach can be to ask what constraints would be loosened by the presence of a technological development.

Ryan, Michael. "Interrogative Behavior in Business Telephone-Communication." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The purpose of this study was to predict the type of communication technology which will replace the telephone as a means of business communication by the year 2000 A.D. The report describes the parameters of interrogative telephone communication behavior in order to predict alternative communication media for future business communication. Specifically, it presents the findings of an analysis of interrogative communication behavior in business telephone conversations and draws forth implications for future communication technologies.

Ryan, Michael G. "The Influence of Teleconferencing Medium and Status on Participants' Perception of the Aestheticism, Evaluation, Privacy, Potency and Activity of the Medium." Communication Research Centre, Communications Canada, paper presented at Canadian-American Communication Symposium, Buffalo, May 1975.

The author investigated users' reactions to teleconferencing. The aim of the study was an attempt to compare audio and video teleconferences with face-to-face conferences. The study addressed the following question: What influence does the teleconferencing medium and status have on the aestheticism, evaluation, privacy, potency and activity of the conferencing medium? The study showed that a high channel capacity face-to-face conferencing medium was perceived as more esthetically pleasant and evaluated more positively than the narrow channel of audio teleconferencing. Moreover, audio teleconferencing was perceived as being more private than video teleconferencing. Other results of the study are discussed.

Ryan, Michael G. and Craig, James G. "Intergroup Telecommunication: The Influence of Communications Medium and Role Induced Status Level on Mood, and Attitudes Towards the Medium and Discussion." Communications Research Centre, Department of Communications, Canada, Paper presented at Annual Meeting of the International Communication Association, Chicago, 1975.

This study attempted to compare audio and video teleconferences with face-to-face

conferences. The study addressed the following research question: What influence does the teleconferencing medium and role-played status level have on attitudes towards the medium, attitudes towards the discussion and the participants' mood? The results of this study support the information theory paradigm which generated the research hypothesis. The information theoretic rationale for the hypotheses argued that attitudes towards the medium, towards the discussion, and the participants' mood would relate directly to channel capacity. Thus, attitudes towards the medium, discussion, and participants' mood would be most positive in the wide channel band width face-to-face conferencing condition and least positive in the narrow channel audio teleconferencing condition. In this study, such was the case.

Ryan, M. G. and Rose, J. F. C. "The Influence of Communication Medium and Role Played Status Level on Aggression, Anxiety, Concentration, Elation and Surgency." Unpublished manuscript, 1975.

The mood of the user in different communication media could well affect the potential use to be made of the medium involved. In this experiment, the Nowlis 'Mood Adjective Check List' was the dependent measure. Three different intergroup communication media (audio, video with audio, and face-to-face) were tested on two occasions with federal government executives at a management development course. On both occasions a control group for 'status' was used. All individuals were placed in groups, and each group received all three different media but in different presentation orders. Partial support was found for the information theory paradigm which predicted that more positive mood states would be achieved in wide channel media.

Silverman, George. "Discussion Dynamics." *On the Line*, 16 November 1970.

The author discusses some of his research in group dynamics that is especially relevant to Telesession participants. "The Blindfold Experiment" illustrated what can happen when the visual element is removed from conversation. The author experienced the absence of usual face-to-face problems: eye contact, crosstalk, distraction. On the other hand, there were some disadvantages as well: sensory deprivation, for example, and a self-consciousness about the normal gestures one uses when conversing. The question of interest then is: "Would the telephone incorporate the advantages of the 'blindfold test' without the disadvantages?" The author believes the advantages are obvious and the disadvantages are not there because one isn't blindfolded on the telephone. Therefore, although your eyes cannot establish contact with other speakers, they can operate normally providing the input necessary to function.

Sinaiko, H. Wallace. "Teleconferencing: Preliminary Experiment." Research Paper P-108, Institute for Defense Analysis, Research and Engineering Support Division, November 1963.

This paper is one of a series on teleconferencing conducted by the Institute for Defense Analysis. Two purposes of the experimental phase of the Teleconferencing Project were: 1) to learn whether it would be profitable to conduct laboratory research in a more formal, teleconferencing project and 2) to gain some first hand experience in order to define procedural problems of teleconferencing. The laboratory studies gave positive support of both aims. Conclusions from the experiment are given.

Williams, Ederyn and Chapanis, Alphonse. "A Review of Psychological Research Comparing Communications Media." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The authors summarize laboratory research and fieldwork which compares face-to-face communication with communication via various electronic media. Results imply that in educational settings, telecommunication is as effective and acceptable as face-to-face communication. The studies also indicate that complex, expensive video systems are unnecessary for educational tasks.

The authors conclude that, with the recent trend toward extension education, telecommunications may most benefit older, already-employed persons who wish to upgrade their skills.

Williams, Ederyn. "A Summary of the Present State of Knowledge of the Substitution of Face-to-Face Meetings by Telecommunicated Meetings: Type Allocation Revisited." Long Range Studies Divisions, Post Office Corporation, P/74294/WL, London, 1974.

The type allocation process is described as consisting of four stages: 1) the definition of the different types of face-to-face meetings, 2) the allocation of these types of meetings to media which would effectively accommodate them, 3) the measurement of the frequency of the different types of meetings, 4) the calculation from (2) and (3) of the proportion of face-to-face meetings which could be transferred to various telecommunication media. Each of these four stages is discussed in detail. The bulk of the paper consists of the discussion of the laboratory work on the effectiveness of telecommunication media as compared to face-to-face communication. Twenty-nine laboratory experiments are described. *On the basis of meeting task alone*, a majority of meetings seem capable of transfer from face-to-face mode in which they now take place to a telecommunication medium, and for those meetings which can be so transferred, a majority seem transferable to an audio only medium, a minority require a full audio-video medium.

Zimmerman, Harry. "Assessment Concepts for the Education Telephone Network." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The article's major theme is assessment for the purpose of program development in Educational Telephone Communications. The author states that his efforts should be thought of as the study of complex phenomenon involving the fields of education and communication. The unifying concept is that of program development, and the assessment procedures involve both a program effectiveness checklist and a cost/benefit approach.

Zimmerman, Harry, et al. "Educational Communications Research: Educational Telephone Network." Unpublished manuscript, University of Wisconsin-Extension, Madison, January 1968.

Research in educational telephone communication is perceived as the study of a complex phenomenon which involves the fields of education and communication. Two major variables are examined: the profile of the adult participant and the components of educational communication. Participant information and program evaluations were obtained through the development of a rating scale, the Program Evaluation Checklist. The research instrument was employed in the evaluation of a library science, educational telephone network program. The research design and results are presented and discussed.

Zimmerman, Harry. "Evaluation Inference Applied to Programming on an Educational Telephone Network--A Beginning." Paper presented at the Adult Education Research Conference, Minneapolis, Minn., February 1970.

A study was made of a noncredit home economics program presented by the University of Wisconsin-Extension over the statewide Educational Telephone Network (ETN). The study was limited to the total population involved in one program (54) and their immediate reaction to that program. Methodology used was a combination of action research and field research. The instrument was developed around six factors: environment, content, program process, lecturer, moderator and technical qualities of the ETN. Variables concerned with the various factors were interspersed and resulted in 48 items plus a nine-point scale for an overall assessment of the program. A four-point interval scale was used with each of the 48 variables. The instrument was open-ended, with provision for suggestions for improvement. Subjective evaluative inference based on means and standard deviations indicated

the overall program was somewhat better than a possible average but with room for improvement.

Technical

Alvarez, J. A., Grote, W. W. and Nahabedian, C. E. "Conferences and Classes Via PCT: If You Can't Come, Call." *Bell Laboratories Record*, April 1973.

With extension microphones and more power than its sister unit, the speakerphone, the Portable Conference Telephone can be used for large classes or conferences. Technical changes and modifications since its inception are outlined. Examples are given of the business and educational institutions which have already adopted the PCT.

Braun, D., Gilbertson, D. and Hansen, H. "ETN: A Technical System." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The intent of the paper is to present a picture of Wisconsin's ETN (Educational Telephone Network) as a technical system. The authors describe what exists today, users' requirements, general design criteria and some of the problems and solutions encountered during ETN's development and implementation phases. The three major components of the ETN system, which are examined in the article, consist of the network organization studios and control rooms, the statewide telephone transmissions system and the individual station location equipment. Photographs and diagrams of equipment and equipment set-ups are given.

"Lectures by Phone: Network Aids Education." *Trend*, October 1975.

The article describes how the Educational Telephone Network (ETN) has improved its equipment, thereby expanding network size and the type of programming planned.

Parker, L. A. "ETN System Instructions/ Technical Data." University of Wisconsin-Extension Brochure, Instructional Communications Systems, Madison, 1973.

This brochure includes an introduction to Wisconsin's Educational Telephone Network, describes who benefits from the Instructional Communications Systems (ICS), gives the technical specifications of the system and concludes with user instructions and packing and storage directions for the Darome Edu-Com Portable Station set.

Pinches, Chris. "Some Technical Aspects of Teaching by Telephone." *Teaching At A Distance*, The Open University, Milton Keynes, U. K. 1974.

The author discusses some of the limitations placed by technology on teaching by telephone and outlines some of the improvements which can be achieved with well-designed instruments. He covers the disadvantages of the handset telephone and the amplified telephone. Lastly, he explores the systems presently available which provide the visual element.

Pinches, C. A. "The Technological Side of Teaching by Telephone." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The author's concern in this paper is with the technical problems of teaching by telephone, but these technical problems are often related to the "interface" with the equipment.

Seyler, J. "Electronic Blackboard Permits Graduate Engineering Course Offerings to Engineers in Industry." 1976 College Industry Education Conference Proceedings, University of Illinois, Champaign, 1976.

The University of Illinois at Urbana-Champaign has, for the past ten years, been particularly interested in developing an effective program to better serve engineers in the state of Illinois. They now have a delivery system composed of telephone and electronic blackboard, which has most of the advantages of all the systems used to date, and very few, if any, of the disadvantages. This system is being used to present graduate engineering and/or continuing education engineering courses and conferences in several cities in Illinois simultaneously. To date, the evaluation of the system and the

educational program has been very encouraging, particularly in view of the quality of the program generated.

Teleconference Systems

Box, Roger. "The Oklahoma Teleconference Network, A Bridge to Continuing Education and Communication Between Health Professionals and Hospitals." Unpublished manuscript, Oklahoma Regional Medical Program, Oklahoma City.

The article gives a history of the Oklahoma Regional Medical Program (ORMP) since its inception in 1966. The author briefly discusses the ORMP's scope and flexibility and assesses and evaluates the telephone network system's value. Due to the success of ORMP, new teleconference projects in Oklahoma have originated. The author gives a profile of an urban development project in Oklahoma City, and an area-wide development program--ADA.

"A Brief History of the Network." Unpublished manuscript, Division of Continuing Education, Kansas State University, Hoxie, 1972.

This paper provides a detailed account of the progress of the Kansas educational telephone network from its beginning in spring of 1970 to 1972. The expansion of the network has enabled each of the six Regents Schools to make available throughout Kansas their specific specialties. The network seems to "have a great future."

Dobbs, Ralph C. and Mowrer, John L. "Updated Party Line for Adult Education," *Journal of Extension*, 9 (3), Fall 1971.

The Missouri telephone lecture network is presently used for extension programming with health professionals. But there's potential for extending this technique to many adult groups--professional and nonprofessional. The authors describe why the network was established, how it works and some of its advantages. The greatest advantage of the system for the participant is he need not travel long distances to attend professional meetings. The outlet for the system is often in the same building where he works.

"Expanding Educational Network Based on Party Line Hook-Up." *Telephony*, 7 February 1970, pp. 23-26.

Medical professionals in western New York and eastern Pennsylvania now have access to a two-way communications system through a telephone lecture network. The base of the network is the Regional Medical Center in Buffalo, New York. It is connected with five hospitals in the two states. On the whole, participants find it to be a flexible means of presenting material, a system able to reach outlying areas at an economical price.

King, Harold D. "The Early Years of the Educational Telephone Network in Wisconsin." Unpublished article, University of Wisconsin-Extension, Madison, November 1968, pp. 1-3.

The author discusses the use of the telephone for education, both as an individual instructional tool and as an educational telephone network. He describes how Wisconsin's Educational Telephone Network has been used, giving examples which illustrate the expansion of the network from 1962-68. He attributes the network's growth to technological improvements and the efforts of enthusiastic educators and participants.

King, Harold D. and Parker, Lorne A. "Wisconsin's University Extension Educational Telephone Network." Telelecture presentation from Madison, Wisconsin to University of Minnesota's Annual Extension Conference in St. Paul, Minn., 23 October 1968.

The authors aim to present information on the telephone as a way to move increasing amounts of information to increasing numbers of Extension clients: what ETN is, how it is being used in Wisconsin, how Extension agents, clients and administrators are responding to it, and some of its potential.

King, Harold D. and White, Maurice E. "SCA and ETN Give State-Wide Meeting Without Travel." *Extension Service Review*, United States Department of Agriculture,

Extension Service, 39 (10), October 1968.

The authors explain the Educational Telephone Network and the Subsidiary Communications Authority: how they function, who takes advantage of them, and the variety of ways the "party line" (ETN) and "Piggyback FM" (SCA) are being used by University Extension faculty.

Myers, Kent C. "Learning by Telephone." *The Clearing House*, April 1965.

The author describes how the Oregon Program for the Lake Oswego Public Schools initiated a telelecture system at minimal cost and effort. The author suggests steps to be taken in planning the system and in organizing a telelecture program. He concludes with a listing of the educational advantages of the telelecture method.

Pace, William G., Scheikart, Robert B. and Watson, Rodney A. "Ohio Medical Education Network - 1969-1970." Unpublished manuscript, Ohio State University, Columbus, November 1969.

The author discusses what the network has been doing to overcome the "communications lag" by providing postgraduate training in the doctor's own hospital at the minimum of inconvenience and time lost from patient care. Activities of the Ohio Medical Education Network were broadened to include training for nurses and broadcasts over television.

Parker, Lorne A. "Bringing the Boundaries of the Campus to the Boundaries of the State." *Views*, 53 (20), February 1968, p. 9.

The author discusses Wisconsin's Educational Telephone Network: what it is, why it started, the benefits of the system such as convenience and flexibility, courses offered via the telephone network and future plans for expansion of the system.

Parker, Lorne A. "Educational Telephone Network and Subsidiary Communications Authorization: Educational Media in Continuing Education in Wisconsin." *Communication News*, June 1972.

The author explains why the Educational Telephone Network (ETN) and Subsidiary Communications Authorization (SCA) were developed, how the systems work, charts their growth, discusses the types of programs offered on ETN-SCA and explores the various ways the networks are used. Evaluation of the ETN-SCA systems involves the measurement of both education and communication. The author lists some of the advantages to the system, and mentions that the response to the Educational Telephone Network in Wisconsin has been varied, but is generally favorable.

Parker, Lorne A. "The Educational Telephone Network and Subsidiary Communications Authorization (SCA Piggyback)." University of Wisconsin-Extension, Madison, 1967.

The author explains what Wisconsin's Educational Telephone Network (ETN) is and how it operates. An explanation of how SCA is transmitted on the FM Channel is given, and charts are included which show the FM Channel and the breakdown of the FM signal.

Parker, Lorne A. "ETN . . . A Way Not to Travel." *Telephone Engineer and Management*, 15 August 1974, p. 64.

The article covers briefly what Wisconsin's Educational Telephone Network (ETN) is, why it originated, how it operates and talks of the many ways in which the system can be used. The author lists the special capabilities which make it significant as an educational medium: it provides "continuing education," offers great economy in time and money, reaches audiences previously neglected, and reaches talented professionals who otherwise would be in an educational vacuum.

Parker, Lorne. "Teleconferencing as an Educational Medium: A Ten Year Perspective from the University of Wisconsin-Extension." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

This paper recounts the history of the development of the University of Wisconsin-Extension's Educational Telephone Net-

work (ETN), and Statewide Extension Education Network (SEEN), and discusses the operation of these systems today. Equipment, cost, technical status, program evaluation and administration of ETN and SEEN are covered in some detail.

Parker, Lorne A. "Wisconsin Idea Joins the Party Line." *Program Preview*, 1 (9), November 1968, pp. 19-21.

The author describes what Wisconsin's Educational Telephone Network (ETN) and Subsidiary Communications Authorization (SCA) are, why they were developed and how they function. The author also discusses the possible uses for the systems: the ways in which the boundaries of University Extension can be extended to better serve the educational needs of the state.

Parker, Lorne A. "Wisconsin's Educational Telephone Network." *Wisconsin School News*, March 1968, p. 8.

The author covers briefly what Wisconsin's Educational Telephone Network (ETN) is, why it was developed and discusses what a typical program on the network is like. The author concludes with a discussion of the educational use of the ETN and Subsidiary Communications Authorization (SCA) systems.

Pfeiffer, John. "Network Facilities Offer Academic Expertise." *Audiovisual Instruction*, February 1971.

The Kansas City Regional Council for Higher Education is one of the oldest educational consortiums in the country--one whose 18 member colleges decided they could accomplish more collectively than if they functioned independently. Communication among the member campuses was slow, even archaic, before the establishment of the KCRCHE network. Most needed was the ability to place conference calls among the 18 campus locations. To achieve this flexibility, the network was custom engineered. In addition to conferencing and telelecture programs, the network sponsors inter-college debates and transmits other types of programs, demonstrating the versatility and flexibility of the system.

"Progress Report from Oklahoma Regional Medical Program." Oklahoma Medical Regional Program, University of Oklahoma Health Sciences Center, Oklahoma City, March 1975.

The report begins with the "reason for Regional Medical Programs," and is followed by the changes and progress that have taken place since the project's inception in the late sixties. The purpose of the brochure is to describe ORMP's new directions (the emphasis for 1975) and how those in the program hope to help change and improve the delivery of health care for the people of Oklahoma.

Raccoli, Susan. "Bringing In-Service Education to Your Backyard." *Wisconsin School Musician*, February 1975, pp. 10-11.

The author gives a brief explanation of the origins of the Educational Telephone Network (ETN) and how the system functions. Examples are given of the wide variety of program offerings on the system. She feels ETN to be flexible, economical, and efficient. A list of the ETN Listening Locations in Wisconsin is included.

Rookey, Ernest J., Gill, Lester W. and Gill, F. Jean. "An Educational Telephone Network." *Educational Technology*, December 1971.

The authors tell of the development and expansion of the educational telephone network system in Finger Lakes Region, New York. The system had been in use for three years (1967-December 1971) and had been found to be valid as an instructional medium. The authors conclude that the medium does require some special handling, but nothing that a typical school district cannot provide with its existing personnel.

Schweikart, Robert and Bartfay, Arthur. "The OSU Center for Continuing Medical Education's Efforts to Bring Two-Way Instruction to the Health Professions." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

This paper examines the four networks of the Center for Continuing Medical Edu-

cation of the Ohio State University of Medicine (a T.V. network for physicians, an FM radio network for pharmacists, an FM network for nurses, and the Ohio Medical Education Network, an audio network for physicians). Emphasis in the paper is on OMEN audio network for physicians, which began its fifteenth year of service in September of 1976.

"Two-Way Telephone Network Series." *Regional Medical Program of Western New York*, 1 (3), April 1968.

In an effort to help solve the problem of the "information gap," H.O.W.N.Y. (Health Organization of Western New York) has established a two-way communication network system which is designed to link the hospitals of Western New York and Erie County, Pennsylvania, and other regions with the Continuing Education departments of the State University of New York Schools of Medicine and Nursing and Rosewell Park Memorial Institute.

Vernon, Edwin. "Illinois TeleNet 70-76." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

The author describes the development of the Illinois TeleNet (forty-eight station dedicated telephone network) between 1970-76. Equipment used, programming and evaluation are the major areas covered.

Vernon, E. W. "TELENET--A New Educational Tool Helps Extension Service Reach Wider Audiences." *Illinois Research*, University of Illinois Agricultural Experiment Station, 13 (2), Spring 1971.

In 1971, the University of Illinois' Cooperative Extension Service had a new educational tool known as TeleNet. This private telephone network linked together 19 stations, most of them in county extension offices. Plans called for the network to expand to 23 stations. The article includes reasons why the network was started and goals for its future.

Weeke, Harold. "The UNIVEX NET Teaching System." Unpublished manuscript, University of Illinois-Extension, Champaign, 16 June 1969.

This paper explains what the University of Illinois UNIVEX system is and how it operates. In the fall semester 1968, an extensive and systematic evaluation of this method of instruction was undertaken. The paper explores four categories of information used in making this evaluation: 1) final grades earned by UNIVEX students compared to on-campus students, 2) course evaluation questionnaire responses of remote students compared to students on campus, 3) written comments from off-campus students, and 4) written comments from instructors using the UNIVEX NET. The results of this evaluation indicate that teaching via the UNIVEX NET was not only feasible from a technological point of view, but that such instruction was also effective from an educational viewpoint.

General

Baird, Marcia and Parker, Lorne A. "Introduction to Teleconferencing." Unpublished manuscript, University of Wisconsin-Extension, Madison, January 1976.

The paper deals with the basics of teleconferencing: what teleconferencing is, the uses to which it can be put and the types of teleconferencing. The authors examine what factors make telephone systems successful, discuss current activity in the field of teleconferencing, and briefly review research projects in teleconferencing. The authors conclude with eight advantages of the teleconferencing system.

"Communications Behavior Laboratory." Communications Research Centre, Department of Communications, Ottawa, Ontario, Canada.

This paper discusses the laboratory: its purpose, rationale, research plan (voice stress, physiological stress, psychological stress and possible future studies) and resources (personnel, space, equipment).

Craig, Jame G. "Pros and Cons of Audio Teleconferencing." Paper in part presented at a Teleconferencing Symposium at Bell-Northern Research, Ottawa, January 1975.

The author, in a point-by-point fashion, covers reasons why the need for teleconferencing is increasing and how teleconferencing can partially meet these growing needs. He then proceeds, in the same manner, to list the behavioral and organizational advantages and disadvantages of audio teleconferencing. For these last two categories, the author accompanies each point with a reference.

Daniel, John and Turok, Ben. "Teaching by Telephone: A Two-Way Communication Mode in Distance Education." Proceedings of the Tenth ICCE World Conference, Brighton, England, 1975, pp. 133-40.

An examination of telephone teaching systems in several areas of the world indicates that technical problems need not be obtrusive. However, this study also reveals that to date most such systems have been developed to extend classroom courses, and that success in this venture depends on three factors: the simplicity and flexibility of the equipment used, the unattractiveness to the students of the available alternatives, and the provision of quality written materials.

"Dial 'F' for Future." *Science News Letter*, 28 August 1965, pp. 134, 142.

This brief article explores some of the possibilities of the telephone in the future, and speaks of what was being done with the telephone in 1965 to increase its uses and to provide more services to its users.

Grabowski, Stanley M. "The Telephone as an Instructional Method in Adult Education." *Adult Leadership*, September 1972.

This article explains the various types of teleteaching: telelectures, teleconferences and telewriting, and gives examples of what systems across the country are doing in undergraduate and graduate programs, refresher courses, extension programming and continuing professional education. The author outlines Peterson's conclusions (from studies conducted at the University of Wisconsin's home economics department) and concludes the article with supplementary documents relating to various aspects of instruction by telephone.

Hicks, Bruce L. "CIDAC-A Concept in Educational Technology." *Audiovisual Instruction*, September 1971.

The author discusses two devices he feels are promising that are under the generic term CIDAC (Communication Among Inexpensive Displays and Computer), and describes their educational applications. It appears that CIDAC could provide computer-assisted input and output in graphic form, could supply several types of recording and storage, and could be operated at a distance.

Lewis, Philip. "Telecommunications: New Party Line for Education." *Nation's Schools*, 78 (3), September 1966.

The author explains, based on experience with a telephone lecture program at Stephens College, Missouri, how telelectures work, what the costs involved are and how the network is able to reach shut-ins. He also discusses how facsimile units, electrowriters and slow-scan television operate.

"Librarian is Awarded Certificate." *Oshkosh Northwestern*, Wisconsin Press Association, Clipping Bureau Division, 9 August 1968.

Part of the article deals with librarian Nancy McCue and her impressions of the Educational Telephone Network (ETN) course she participated in. She found the Library Science program gave her practical help in her field, and she gained much from discussions with other librarian students. The article mentions that the lectures were "relayed to other centers by telephone."

Oakland, Don. "ETN Class Extends Statewide." *Clintonville Tribune*, 1 May 1975.

This article includes a brief explanation of how ETN works and how it began. What is unique is that the article talks of ETN from a student perspective, as Don Oakland relates his experiences with the Educational Telephone Network.

Parker, Lorne A. "The Development and Utilization of Subsidiary Communications Authorization." *Educational Broadcasting Review*, 3 December 1969.

This article is based on the author's book, *SCA, A New Medium* (Madison: University Extension, University of Wisconsin, 1969). He gives a brief history of Subsidiary Communications Authorization systems, describes the technology, and treats extensively the commercial and educational utilizations.

Parker, Lorne A. and Riccomini, Betsy, comps. *A Report on University Applications of Satellite/Cable Technology*. First Annual International Communications Conference, University of Wisconsin-Extension, Madison, June 1975.

The broad aim of the conference was to stimulate an ongoing discussion among universities, industry and government on the national and international possibilities of satellite and cable development in the next decade. The report is designed primarily for educators, technologists and government officials to give them a basic grasp of the potentials of satellite/cable TV for education.

Parker, Lorne A. and Riccomini, Betsy, comps. *The Status of the Telephone in Education*, Second Annual International Communications Conference, University of Wisconsin-Extension, Madison, May 1976.

This book is a collection of papers presented at "The Telephone in Education Conference" held in May 1976, by the University of Wisconsin-Extension, Madison. Essays cover a wide spectrum of topics dealing with teleconferencing, ranging from instructional design and technical advances to case studies and research reports.

Rao, Paladugu V. and Hicks, Bruce L. "Telephone-Based Instructional Systems." *Audiovisual Instruction*, April 1972.

The authors review the history of telephone-based instructional systems, and the advantages and services they provide for students, for educational planners and for school districts. The full potential of the telephone as an instructional communications device has not yet been realized, state the authors. The article provides some ideas for people who might not have realized how the telephone can be used.

Short, John. "Teaching by Telephone: The Problems of Teaching Without the Visual Channel." Paper delivered at a conference on Teaching by Telephone, Westfield College, London University, April 1974.

The article lists the advantages of the use of the telephone for educational purposes, business purposes, etc., and deals with limitations inherent in the use of the telephone. Despite these limitations, the practical advantages of teaching by phone can be considerable and most problems associated with communication in the absence of the visual channel can be overcome.

Sivertson, Sigurd and Hansen, Richard H. "The Role of Technology in an Evolving Continuing Education Program for Health Professionals." *Medical Program Technology*, 1 (4), 1973, pp. 187-95.

The author reports on seven years experience in utilization of instructional technology in continuing education programming at the University of Wisconsin. Specific media and methodology used include telephone conferences, dial access library, single concept films, tape/slide programs and slow scan television, with attempts at evaluation of each described.

Turok, Ben. "Teaching by Telephone for Disadvantaged and Remote Students." *The Status of the Telephone in Education*, University of Wisconsin-Extension, Madison, May 1976.

Not all Open University students are able to make use of the face-to-face tutorial service provided for them. Some of these students are homebound, others live too far, in terms of time, effort and cost, from the Study Centres to attend. The telephone seems to be one alternative to maintain reglar two-way contact with these *disadvantaged* and *remote* students and to provide them with a group learning experience.

Yeomans, G. Allan and Lindsey, Henry C. "Telelectures." *The Speech Teacher*, 18 (1), January 1969.

This article describes what telelecture is and gives a brief history of some of the institutions which have utilized, in different

ways, the amplified telephone teaching system. Advantages of using the telelecture system are given and include: flexibility, low cost and convenience. In addition, because the telelecture method has been shown to be used extensively and diversely, it presents an opportunity for new horizons in the speech classroom.

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